Consumption Technical Notes

State Energy Data System 2008: Consumption

Introduction to the Technical Notes

Purpose

All of the estimates contained in the State energy consumption data tables are developed using the State Energy Data System (SEDS), which is maintained and operated by the U.S. Energy Information Adminstration (EIA). The goal in maintaining SEDS is to create historical time series of energy production, consumption, prices, and expenditures by State that are defined as consistently as possible over time and across sectors. SEDS exists for two principal reasons: (1) to provide State energy production, consumption, price and expenditure estimates to Members of Congress, Federal and State agencies, and the general public, and (2) to provide the historical series necessary for EIA's energy models.

Efforts are made to ensure that the sums of the State estimates equal the national totals as closely as possible for each energy type and end-use sector as published in other EIA publications. SEDS State energy consumption estimates are generally comparable to the statistics in EIA's *Annual Energy Review* and *Monthly Energy Review* consumption tables.

The Report

The SEDS consumption tables, available on the EIA website at http://www.eia.gov/emeu/states/_seds.html, provide annual time series estimates of State-level energy use by broad energy-consuming sectors. Companion tables containing State-level price and expenditure estimates can be found at the same website. State-level energy production estimates, a recent addition to SEDS, are available at http://www.eia.gov/emeu/states/_seds_production.html. In addition, tables showing State-level consumption, price, and expenditure estimates by energy source as they are updated for the most current year can be found at http://www.eia.gov /emeu/states/_seds_updates.html.

The following technical notes are provided to assist users in understanding and interpreting the SEDS consumption estimates. Each section describes how the estimates were derived for each individual energy source and lists the sources of all data series. Additional information is contained in the following appendices:

Appendix A. SEDS Variables - lists all of the variable names alphabetically and the formulas used.
Appendix B. Thermal Conversion Factors - lists the conversion factors used to convert physical units into British thermal units and cites the sources for those factors.
Appendix C. Resident Population - provides the State resident population statistics that are used in per capita calculations.
Appendix D. Real Gross Domestic Product - presents the real gross domestic product by State used to calculate total energy consumption per real dollar of economic output.
Appendix E. Metric and Other Physical Conversion Factors
Appendix F. What's New - summarizes the changes made since the last complete release of SEDS data.

Technical notes for State-level prices and expenditures, as well as production, are also available at http://www.eia.gov/emeu/states/_seds_tech_notes.html.

Due to page-size constraints, State tables displayed as Portable Document Format (PDF) files show estimates for only selected years from 1960 through 1995; thereafter, data are shown consecutively through 2008. However, data for all years from 1960 forward are maintained in SEDS and are included in the HTML versions of the tables and in the CSV data files available via EIA's website. All years are covered by the documentation in this report.

All estimates with revisions since the last edition of SEDS that are large enough to be seen in the published tables' level of rounding are preceded with an "R" in the PDF data tables on the website.

Estimates

Estimation Methodologies. Using SEDS, EIA develops estimates of energy consumption by principal energy sources and broad energy-consuming sectors, by State, for a 48-year period. Energy consumption is estimated by using data from existing surveys of energy suppliers that report consumption, sales, or distribution of energy at the State level. Most of the SEDS estimates rely directly on collected State-level consumption data (See "Collected Data and Estimated Values in CSEDS" on page 3, which summarizes the status of current data sources used). Some consumption estimates in SEDS are based on a variety of surrogate measures. The measures are selected principally on the basis of applicability as an indicator of consumption, availability, continuity over time, and consistency. For instance, for petroleum, "product supplied" is a surrogate for consumption and is derived by summing field and refinery production, plus imports, minus exports, plus or minus changes in stocks. State-level sales survey data are used to disaggregate the national petroleum product supplied totals to the States. The measures of consumption and estimation methodologies are explained in detail under each energy source in the Technical Notes.

Methods are also applied to estimate State electrical system energy losses that are not available from any survey. See "Energy Consumption Measures—Total and Site" on page 4 for a discussion about losses and how they are reflected in the SEDS tables. U.S. total electrical system energy losses are allocated to each individual State's end-use sectors in proportion to the sectors' electricity sales. The estimation method does not separately identify electrical system energy losses from interstate flow of electricity. Therefore, specific estimates are developed for Alaska and Hawaii and for the 48 contiguous States and the District of Columbia.

Data Sources. The original source documents cited in the Technical Notes include descriptions of the data collection methodologies, universes, imputation or adjustment techniques (if any), and errors associated with the processes. Due to the numerous collection forms and procedures associated with those reports, it is not possible to develop a meaningful numerical estimate of the overall errors of the integrated data published here.

Reliable, consistent series for long periods of time—especially in the earlier years—are difficult to develop, and estimates and assumptions must be applied to fill data gaps and to maintain definitional consistency. Although SEDS incorporates the most consistent series and procedures possible, users of this report should recognize the limitations of the data that are due to changing and inadequate data sources.

For example, in reports prepared by the Bureau of Mines in the late 1960s and early 1970s, petroleum consumption was equated to demand. Later, consumption was equated to apparent demand and, more recently, to product supplied. Changes in surveys and reduction of data collections, especially after 1978, disturbed the continuity of some petroleum consumption series, most notably for distillate fuel, residual fuel, kerosene, and liquefied petroleum gases. These and other data inconsistencies are explained in detail for each energy source in the Technical Notes.

Comparison with Other Energy Consumption Reports

EIA conducts numerous energy-related surveys. In general, the surveys can be divided into two broad groups. One group of surveys, called supply surveys, is directed to the suppliers and marketers of specific energy sources. Those surveys measure the quantities of specific fuels supplied to the market. The results of supply surveys are combined and published in a number of EIA data products, including the *Monthly Energy Review* and SEDS. The second group of surveys, called energy consumption surveys, gather information directly from end users of energy. Although there are some elements in common, the supply survey data and the consumption survey data have substantially different approaches, capabilities, and objectives. Thus, care must be taken in analyzing SEDS consumption estimates in conjunction with consumption survey data for the following reasons:

- SEDS data are designed to be a broad accounting of energy consumption, covering all energy use and splitting it into major sectors as clearly as possible. The energy consumption surveys are designed to be comprehensive and representative within individual sectors.

Collected Data and Estimated Values in SEDS

Coal. U.S. total coal consumption data by sector are taken directly from EIA's *Annual Coal Report (ACR)* and predecessor publications. Total coal consumption by State and for most sectors is from the *ACR*, except where values are withheld and must be estimated. The State-level disaggregation of the *ACR*'s combined residential and commercial sector are estimates. Data on electric power industry coal consumption by State and coal type are from the EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms.

Natural Gas. Natural gas consumption by State and sector is taken directly from the EIA's *Natural Gas Annual (NGA)*. Natural gas consumed as lease fuel and plant fuel and natural gas delivered to industrial consumers in the *NGA* are combined in SEDS as industrial sector consumption. Natural gas consumed as vehicle fuel and pipeline fuel are combined in SEDS as transportation sector consumption.

Petroleum. U.S. total consumption for each petroleum product is the "product supplied" data from EIA's *Petroleum Supply Annual*. State values for distillate fuel oil, residual fuel oil, and petroleum coke consumption by the electric power industry are unpublished data from the EIA-923, "Power Plant Operations Report," and predecessor forms. All other State and sector values for consumption of petroleum products are estimates based on sales data from several sources.

Renewable Energy. **Solar thermal and photovoltaic energy** consumption in the residential and commercial sectors is estimated. Solar energy use in the electric power sector is collected on the EIA-923, "Power Plant Operations Report," and predecessor forms. The use of **Wind** energy in the electric power sector is also collected on those forms. **Geothermal** energy direct use and by heat pumps in the residential, commercial, and industrial sectors are estimates based on a survey from the Oregon Institute of Technology Geo-Heat Center. Electricity generated from geothermal energy by the electric power sector is collected on the EIA-923, "Power Plant Operations Report," and predecessor forms. **Hydroelectricity** generation by cogenerators in the commercial and industrial sectors; and generation by the electric power sector is collected on the EIA-923, "Power Plant Operations Report," and predecessor forms. **Wood** consumption in the residential and commercial sectors are estimates based on data collected on the EIA Form EIA-457 "Residential Energy Consumption Survey" and Form EIA-871 "Commercial Buildings Energy Consumption Survey." Additional **wood and waste** use for electricity generation by cogenerators in the commercial and industrial sectors and by the electric power sector is collected on the EIA-923, "Power Plant Operations Report," and predecessor forms. State-level consumption of **fuel ethanol**, by sector, is estimated, although the U.S. total is collected on several forms and reported in EIA's *Renewable Energy Annual*.

Nuclear Electric Power. Nuclear electricity generation by State is collected on the EIA-923, "Power Plant Operations Report," and predecessor forms.

Electricity. Electricity consumption is sales data by sector and State from the *EPA* with one exception. The *EPA* "Other" category is allocated to the transportation and commercial sectors in each State is estimated from 1960 through 2002.

Electrical System Energy Losses and Net Interstate Flow of Electricity. These series are estimated in SEDS.

However, the sectors are restricted for purposes of creating relatively homogeneous, well-defined populations and for aiding in sampling and data collection. For example, the Commercial Buildings Energy Consumption Survey covers only energy consumption in commercial buildings, while SEDS includes other commercial consumption, such as street lighting and public services; and the Manufacturing Energy Consumption Survey covers only manufacturing establishments, while SEDS includes other industrial energy consumption (i.e., mining, construction, agriculture, fisheries, and forestry). Further, the consumption surveys do not cover all energy-using sectors. Therefore, energy consumption surveys cannot be summed together to account for all energy use.

- Energy consumption surveys provide user characteristics that allow for both macro-level (for major sectoral sub-populations) and micro-level (at the unit of data collection) interpretive analysis. The surveys of energy consumption by residential households from the Residential Energy Consumption Survey (Form EIA-457 series) and by commercial buildings from the Commercial Buildings Energy Consumption Survey (Form EIA-871 series) provide detailed information about the energy end users, their size, their stock of energy-consuming

Energy Consumption Measures—Total and Site

Sources of energy can be categorized as primary and secondary. Primary sources of energy, such as coal, petroleum, and natural gas are consumed directly. Electricity is a secondary form of energy that is created from primary energy sources. The amount of electricity actually consumed by the end user (site consumption) does not include the energy lost in the generation and delivery of the electricity to the point of use.

Primary sources of energy are measured in applicable physical units. Coal is measured by the short ton (equal to 2,000 pounds); petroleum, by the barrel (equivalent to 42 gallons); and natural gas, by the cubic foot. Energy sources are also measured by their heat content, generally expressed in British thermal units (Btu). For example, in 2008, the average short ton of coal consumed by the electric power sector contained 19.713 million Btu (Appendix B Table B13), the average barrel of distillate fuel oil contained 5.825 million Btu (page 162 of Appendix B), and the average cubic foot of natural gas consumed by the electric power sector contained 1,027 Btu (Appendix B Table B3).

Electricity, a secondary form of energy, can also be measured in physical units, commonly kilowatthours, and by heat content. The conventional thermal conversion factor for electricity consumed by the end user (site consumption) is 3,412 Btu per kilowatthour.

In 2008 the electric power sector consumed 40.2 quadrillion Btu of primary energy in order to provide 12.7 quadrillion Btu of electricity for sale. These data indicate that 68 percent of the primary (embodied) energy in the fuels consumed to generate the electricity was used (or "lost") in converting the primary energy to electricity and transmitting and distributing the electricity to the consumers, and 32 percent was used as site (point-of-use) electricity by consumers.

In evaluating these energy consumption tables, the tables titled "Total Energy Consumption" include all primary energy sources, including those used to generate electricity; the electricity generated is not included. Tables showing "Total End-Use Sector Consumption" include columns for the primary sources and electricity that are consumed by the sector, as well as a column for the estimated energy lost in the electrical system processes. The "Total" column in those tables includes all energy consumed by the sector and the associated energy lost in the generation and transmission of electricity. The column titled "Net" is site energy consumption—that is, the sum of the primary sources and electricity, excluding the electrical system energy losses.

equipment and appliances, and their total energy consumption and expenditures. The Manufacturing Energy Consumption Survey (Form EIA-846 series) collects consumption by type of use and fuel switching capability from manufacturing establishments grouped by manufacturing classification. SEDS, on the other hand, provides limited characterization of the end users of energy but greater geographic and energy product detail, as well as annual historical time series.

- Sectoral classification in SEDS is generally based on supplier classifications of customer accounts, by whatever means suppliers choose to use. (See discussion in next section.) Sectoral classification for the energy consumption surveys is based upon a categorization, verified by end user, of the primary economic activity of the data collection unit (household, building, or establishment).

- The energy consumption surveys provide data at national and Census region and/or Census division levels, whereas the estimates in SEDS are on national and State levels.

- The reference periods are also different in that SEDS covers calendar years from 1960 through 2008, while the consumption surveys are for selected years, and the residential end-use surveys taken prior to 1987 cover a heating season year (i.e., April through March). Beginning with the 1987 residential end-use survey, the reference period is a calendar year.

For a more detailed description of the differences between SEDS and the energy consumption surveys, see the EIA analysis report *Energy Consumption by End-Use Sector: A Comparison of Measures by Consumption and Supply Surveys*, DOE/EIA-0533, April 1990.

Energy-Consuming Sectors

The consumption estimates in SEDS are based on data collected by various surveys that do not necessarily define the consuming sectors exactly the same way. The Technical Notes of this report describes in detail for each energy source how the collected data series are combined and assigned to SEDS consuming sectors. To the degree possible, energy consumption in this report has been assigned to the five sectors according to the following general definitions:

- **Residential Sector:** An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.

- **Commercial Sector:** An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. *Note*: This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.

- **Industrial Sector:** An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31–33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.

- **Transportation Sector:** An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. In this

report, natural gas used in the operation of natural gas pipelines is included in the transportation sector.

- **Electric Power Sector:** An energy-consuming sector that consists of electricity-only and combined-heat-and-power plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the public. *Note*: This sector includes electric utilities and independent power producers.

Sector Definition Discrepancies. Although the end-use allocations are made according to these aggregations as closely as possible, some data are collected by using different classifications. For example, electric utilities may classify commercial and industrial users by the quantity of electricity purchased rather than by the business activity of the purchaser. Natural gas used in agriculture, forestry, and fisheries was collected and reported in the commercial sector through 1995. Beginning with 1996 data, deliveries of natural gas for agriculture, forestry, and fisheries are reported in the industrial sector instead. Another example is master-metered condominiums and apartments and buildings with a combination of residential and commercial units. In many cases, the metering and billing practices cause residential energy usage of electricity, natural gas, or fuel oil to be included in the commercial sector. No adjustments for these discrepancies were made.

SEDS does not provide further disaggregated end-use consumption estimates. For example, the industrial sector cannot be broken down into the chemical or rubber industries, all manufacturing, or agriculture. The input series for the system are provided in broad end-use categories from the data collection forms and are not available by the individual components. Additional disaggregated regional information, such as counties or cities, are also not available from SEDS.

Section 1. Documentation Guide

The following Technical Notes describe how consumption estimates contained in the State Energy Data System (SEDS) are derived. The following six sections, one for each energy source and total energy, provide: descriptions of all the data series that are entered into SEDS; the formulas applied in SEDS for creating additional data series; and notes on special circumstances for any series.

Appendix A is an alphabetical listing of the variable names and formulas used in the system; Appendix B lists the conversion factors used in SEDS to convert physical units into British thermal units and gives the sources for those factors; Appendix C provides the U.S. Department of Commerce, Bureau of the Census, resident population data used in per capita calculations; Appendix D presents the real gross domestic product by State used to calculate total energy per chained (2000) dollar of output; Appendix E provides metric and other physical conversion factors for measures used in energy analyses; and Appendix F summarizes changes in SEDS content made since the last complete release of data.

There are over 400 variables used in SEDS to create the estimates in this report. All of the variables are identified by seven-letter names, such as MGTCPAL. In the following example, MGTCPAL is the identifying code for data on motor gasoline total consumption in physical units in Alabama:

Characters:	**MG**	**TC**	**P**	**AL**
Positions:	1 and 2	3 and 4	5	6 and 7
Identity:	Type of Energy or Product	Energy activity or consumption end-use sector	Type of data	Geographic

The energy sources and products in SEDS, which are represented by the first two letters of the variable name, are:

AB = aviation gasoline blending components
AI = aluminum ingot
AR = asphalt and road oil
AS = asphalt
AV = aviation gasoline
BM = biomass
CC = coal coke
CG = corrugated and solid fiber boxes
CL = coal
CO = crude oil, including lease condensate
CT = catalytic cracking
DF = distillate fuel oil
DK = distillate fuel oil, including kerosene-type jet fuel
EL = electricity
EN = fuel ethanol
ES = electricity sales
FF = fossil fuels
FN = petrochemical feedstocks, naphtha less than 401° F
FO = petrochemical feedstocks, other oils equal to or greater than 401° F
FS = petrochemical feedstocks, still gas
GE = geothermal energy
HV = conventional hydroelectric power
HY = hydroelectric power
JF = jet fuel
JK = jet fuel, kerosene-type
JN = jet fuel, naphtha-type
KS = kerosene
LG = liquefied petroleum gases
LO = electrical system energy losses
LU = lubricants

MB = motor gasoline blending components
MG = motor gasoline
MM = motor gasoline excluding fuel ethanol
MS = miscellaneous petroleum products
NA = natural gasoline (including isopentane)
NG = natural gas (including supplemental gaseous fuels)
NN = natural gas excluding supplemental gaseous fuels
NU = nuclear electric power
OC = organic chemicals
P1 = asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products"
PA = all petroleum products
PC = petroleum coke
PI = paints and allied products
PL = plant condensate
PM = all petroleum products excluding ethanol blended into motor gasoline
PO = other petroleum products
PP = pentanes plus
RD = road oil
RE = renewable energy
RF = residual fuel oil
SF = supplemental gaseous fuels
SG = still gas
SN = special naphtha
SO = photovoltaic and solar thermal energy
TE = total energy
TN = total net energy (net of electrical system energy losses)
UO = unfinished oils
US = unfractionated stream
WD = wood
WS = waste
WW = wood and waste
WX = waxes
WY = wind

The consumption end-use sectors, identified by characters three and four of each variable name, such as:

AC = transportation sector consumption
CC = commercial sector consumption
EG = electric power sector generation (also consumption)
EI = electric power sector consumption
IC = industrial sector consumption
RC = residential sector consumption
TC = total consumption of all sectors

Many other characters occur in the third and fourth positions of the variable names for the sales, deliveries, and distribution data series used in the intermediate calculations in SEDS to derive the end-use consumption estimates. Examples of these codes are:

BK = sales for use in vessel bunkering
CA = capacity
KC = consumption at coke plants
LP = lease and plant fuel
IN = deliveries to the industrial sector
OD = distribution to other industrial users
VA = value-added in manufacture

Combining the first two components (the first four letters) produces variable names, such as:

RFBK = residual fuel oil sold for vessel bunkering
RFAC = residual fuel oil consumed by the transportation sector
NGIN = natural gas (including supplemental gaseous fuels) delivered to the industrial sector
NGIC = natural gas (including supplemental gaseous fuels) consumed by the industrial sector

The fifth character of the variable names in SEDS identifies the type of data by using one of the following letters:

B = data in British thermal units (Btu)
K = factor for converting data from physical units to Btu
M = data in alternative physical units
P = data in standardized physical units
S = share or ratio expressed as a fraction
V = value in million dollars

In general, Data entered into SEDS are in physical units, represented by a "P" in the fifth character; for example, coal data are in thousand short tons, petroleum data are in thousand barrels, and natural gas data are in million cubic feet. In a few cases, data are obtained from the source

documents in different units, such as thousand gallons instead of thousand barrels, and are represented by an "M" until converted in SEDS to the unit that is consistent with other variables. Conversion factors, represented by a "K" in the fifth character, are applied to the physical unit data to convert the data to British thermal units, a common unit for all forms of energy. The derived data series in thousand British thermal units are represented by "B" in the fifth character. In a few cases, consumption estimates are derived by calculating shares of aggregated consumption data. The fractions used to calculate the consumption shares are identified by an "S" in the fifth character. The consumption estimates for some petroleum products are based on the value added in the manufacturing process by related industries in each State. The data series for those industry activities are in million dollars, and the variable names contain "V" in the fifth character.

There are a few variables that do not follow the convention:

TPOPP = resident population
GDPRX = real gross domestic product
TETGR = total energy consumption per real dollar of GDP

Per capita consumption is represented by "TP" in the third and fourth positions of the variable name.

The last two characters of each variable name are for geographic identification. Geographic areas used in SEDS are the 50 States and the District of Columbia (represented by the U.S. Postal Service State abbreviations) and the United States as a whole. Some estimates of electricity sales and losses are derived by using only the contiguous 48 States and the District of Columbia, and the variables used in those calculations are identified by "48" in the last two characters of the names. The geographic area codes used in SEDS are shown in Table TN1.

Throughout this report, the term "State" includes the District of Columbia. Throughout this documentation, "ZZ" is used as a geographic identifier to represent the different State abbreviations that would be interchanged in that position of the variable name.

Table TN1. Geographic Area Codes Used in the State Energy Data System

Code	State	Code	State
AK	Alaska	NC	North Carolina
AL	Alabama	ND	North Dakota
AR	Arkansas	NE	Nebraska
AZ	Arizona	NH	New Hampshire
CA	California	NJ	New Jersey
CO	Colorado	NM	New Mexico
CT	Connecticut	NV	Nevada
DC	District of Columbia	NY	New York
DE	Delaware	OH	Ohio
FL	Florida	OK	Oklahoma
GA	Georgia	OR	Oregon
HI	Hawaii	PA	Pennsylvania
IA	Iowa	RI	Rhode Island
ID	Idaho	SC	South Carolina
IL	Illinois	SD	South Dakota
IN	Indiana	TN	Tennessee
KS	Kansas	TX	Texas
KY	Kentucky	UT	Utah
LA	Louisiana	VA	Virginia
MA	Massachusetts	VT	Vermont
MD	Maryland	WA	Washington
ME	Maine	WI	Wisconsin
MI	Michigan	WV	West Virginia
MN	Minnesota	WY	Wyoming
MO	Missouri	US	United States
MS	Mississippi	48	The contiguous 48 States and the District of Columbia
MT	Montana		

Section 2. Coal

Coal Consumption

Physical Units

Nine data series are used to estimate State coal consumption. Most are U.S.-level consumption and comparable State-level distribution data, and are in units of thousand short tons. "ZZ" in the variable names is used to represent the two-letter State code that differs for each State:

CLACPUS = coal consumed by the transportation sector in the United States;
CLEIPZZ = coal consumed by the electric power sector in each State;
CLHCPUS = coal consumed by the residential and commercial sectors in the United States;
CLHDPZZ = coal distributed to the residential and commercial sectors in each State;
CLKCPUS = coal consumed by coke plants in the United States;
CLKDPZZ = coal distributed to coke plants in each State;
CLOCPUS = coal consumed by other industrial users in the United States;
CLODPZZ = coal distributed to other industrial users in each State; and
CLRCSUS = the residential share of combined residential and commercial coal consumption.

The U.S. totals for the four State-level series are calculated by summing the State data.

State estimates of coal consumed by the residential and commercial sectors combined are made by assuming that coal is consumed in proportion to the amount of coal distributed to the residential and commercial sectors in each State:

$$CLHCPZZ = (CLHDPZZ/CLHDPUS) * CLHCPUS$$

Coal consumed by the residential and commercial sectors is reported combined and little information exists for disaggregating the combined sectors' data. The U.S. Energy Information Administration (EIA) estimates that a decreasing percentage of the combined total is consumed in the residential sector as shown in Table TN2. This estimated percentage is applied to the residential and commercial sectors' total to estimate residential consumption and the remaining quantity is assumed to be commercial use:

$$CLRCPZZ = CLHCPZZ * CLRCSUS$$
$$CLRCPUS = \Sigma CLRCPZZ$$

$$CLCCPZZ = CLHCPZZ - CLRCPZZ$$
$$CLCCPUS = \Sigma CLCCPZZ$$

Table TN2. Residential Sector Share of Combined Residential and Commercial Coal Consumption, 1960 Forward

Years	CLRCSUS	Years	CLRCSUS	Years	CLRCSUS
1960–1962	0.59	1979	0.20	1994	0.15
1963, 1964	0.58	1980	0.21	1995	0.13
1965–1967	0.57	1981	0.18	1996	0.12
1968–1970	0.56	1982	0.17	1997, 1998	0.11
1971	0.49	1983	0.16	1999	0.12
1972	0.43	1984	0.19	2000, 2001	0.11
1973	0.37	1985	0.22	2002	0.12
1974	0.32	1986, 1987	0.23	2003	0.13
1975	0.30	1988	0.22	2004	0.10
1976	0.29	1989	0.21	2005	0.08
1977	0.28	1990	0.20	2006	0.09
1978	0.23	1991–1993	0.18	2007, 2008	0.10

To gain a perspective on these estimates: coal consumed by residential and commercial users combined is less than half a percent of all coal consumed in the past decade.

Consumption in the industrial sector is reported for the U.S. and estimated by State. An assumption is made that coal is consumed by coke plants in proportion to the amount of coal distributed to coke plants in each State. It also is assumed that the consumption of coal by industrial users other than coke plants is in proportion to the amount of coal delivered to the other industrial users in each State. The industrial sector consumption is the sum of coal consumed by coke plants and other industrial users in each State:

CLKCPZZ = (CLKDPZZ/CLKDPUS) * CLKCPUS
CLOCPZZ = (CLODPZZ/CLODPUS) * CLOCPUS
CLICPZZ = CLKCPZZ + CLOCPZZ

There are no data available for estimating the transportation sector's consumption of coal by State. The quantity would be very small. The transportation sector accounted for only 1 percent of the national total consumption in 1960 and none since 1978. An assumption is made that when transportation sector consumption exists, the consumption by State, CLACPZZ, is in proportion to the share of the U.S. industrial sector attributed to each State:

CLACPZZ = (CLICPZZ / CLICPUS) * CLACPUS

Total consumption in each State, CLTCPZZ, is the sum of the sectors' consumption:

CLTCPZZ = CLRCPZZ + CLCCPZZ + CLICPZZ + CLACPZZ + CLEIPZZ

The U.S. total consumption estimates for each of the sectors and the total are calculated as the sum of the States' values.

British Thermal Units (Btu)

Six factors are used to convert coal from physical units to Btu:

CLACKZZ = the factor for converting coal consumed by transportation sector in each State from short tons to Btu;
CLEIKZZ = the factor for converting coal consumed by the electric power sector in each State from short tons to Btu;
CLHCKZZ = the factor for converting coal consumed by the residential and commercial sectors in each State from short tons to Btu; and
CLHCKUS = the factor for converting coal consumed by the residential and commercial sectors from short tons to Btu; and
CLKCKZZ = the factor for converting coal consumed at coke plants in each State from short tons to Btu; and
CLOCKZZ = the factor for converting coal consumed by other industrial users in each State from short tons to Btu.

The electric power sector conversion factor for each State is applied to the physical unit value to estimate coal consumed in Btu:

CLEIBZZ = CLEIPZZ * CLEIKZZ

The residential and commercial sectors' State conversion factor is applied to the physical unit values to estimate coal consumed by the two sectors in Btu:

CLRCBZZ = CLRCPZZ * CLHCKZZ
CLCCBZZ = CLCCPZZ * CLHCKZZ

The industrial sector Btu consumption is estimated in three steps. Coal consumed at coke plants and by all industrial users other than coke plants are converted to Btu using their individual State conversion factors. The industrial sector consumption in Btu is then calculated as the sum of the two industrial components:

CLKCBZZ = CLKCPZZ * CLKCKZZ
CLOCBZZ = CLOCPZZ * CLOCKZZ
CLICBZZ = CLKCBZZ + CLOCBZZ

The transportation sector conversion factor for each State is applied to the physical unit value to estimate coal consumed in Btu:

CLACBZZ = CLACPZZ * CLACKZZ

Total consumption for each State is the sum of the sectors' consumption:

CLTCBZZ = CLRCBZZ + CLCCBZZ + CLICBZZ + CLACBZZ + CLEIBZZ

The U.S. consumption estimates in Btu are calculated by summing the State values for each of the data series. The U.S. average conversion factor for each of the five factors is calculated as the U.S. consumption in Btu divided by the U.S. consumption in physical units for each of the factors.

Additional Notes for Coal

1. The national-level coal consumption data series for the residential and commercial sectors (CLHCPUS), coke plants (CLKCPUS), and industries other than coke plants (CLOCPUS) are from a continuous data source. However, the data series used to develop State-level allocators by end-use sector (CLHDPZZ, CLKDPZZ and CLODPZZ) vary for different time periods.

   For 1960 through 1979, U.S. coal consumption is allocated by State based on the proportion of coal distributed to each State.

   Beginning with 1980, State-level total coal consumption data are available; however, many of these data are withheld at the sector level. Withheld data are estimated by substituting residential and commercial coal distribution data for residential and commercial coal consumption. In many States, this leaves only one other sector withheld, which is derived by subtracting the other known sectors from the State total. In some cases withheld Census division values need to be subtracted out from known U.S. totals before the State-level estimates can be derived.

   Beginning with 2001, additional State coal consumption values are withheld, making it no longer possible to subtract out estimates of coal consumed by coke plants for some States. To estimate the withheld consumption values, the known State-level coke plant coal consumption values are subtracted from the known Census division totals leaving a value to be distributed to the States that have withheld values in that division. Data for the same States from a different EIA data series on distribution of coal to coke plants are used to estimate the withheld consumption data. Distribution data for the three years prior to the year being estimated are summed for each State and its division and each State's share of its division subtotal is used to allocate the withheld coke plant coal consumption to that State. For 2001, Utah was grouped with New York and Pennsylvania to create the subtotal used in the percentage calculations.

   Beginning with 2006, some State-level total coal consumption values that are withheld are first estimated by applying published year-on-year percent changes onto earlier years' published consumption values. In some cases, this would leave only one sector withheld, which is derived by subtracting the other known sectors from the State total.

   In 2008, Form EIA-6A, "Coal Distribution Report - Annual", is discontinued. Estimates for coal consumption by sector are derived from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Instituional Coal Users." Data for the consumer type commercial/institutional are used as estimates for residential/commercial consumption.

   These derived series for the residential/commercial, coke plant, and other industrial sectors are used in SEDS as the distribution data series to calculate coal consumption estimates by State and sector that are consistent with State-level total coal consumption data published in other EIA reports.

2. Total coal consumption by State for 1980 through 1989 published in the EIA *Quarterly Coal Report* do not sum to the U.S. totals due to a quantity called "Unknown" in the source tables. This unknown coal consumption is added to the residential, commercial, and "other industrial" sectors of Alabama, Illinois, Kentucky, Pennsylvania, Tennessee, and West Virginia in proportion to their total distribution of all coal.

3. Prior to 1974, data for distribution of bituminous coal and lignite by State include several groupings of States for which separate State data are not available. These groupings are: (1) Maine, New Hampshire, Vermont, and Rhode Island; (2) North Dakota and South Dakota; (3) Delaware and Maryland; (4) Georgia and Florida; (5) Alabama and Mississippi; (6) Arkansas, Louisiana, Oklahoma, and Texas; (7) Montana and Idaho; (8) Arizona and Nevada; and (9)

Washington and Oregon. Beginning with 1974, individual State distribution data became available. To estimate the 1960 through 1973 State distribution data, the States are disaggregated in proportion to the individual States' shares of each similar State grouping in 1974.

4. The sources used to develop thermal conversion factors for bituminous coal and lignite consumed by the electric power sector—the National Coal Association report and the Federal Power Commission's (FPC) Form 423 and FERC Form 423 published in the *Cost and Quality of Fuels at Electric Utility Plants*—exclude Alaska. However, Alaska reported consumption of bituminous coal and lignite at electric utilities for all years, 1960 forward. Unpublished FPC heat rates for coal at electric utilities in Alaska were used for 1960 through 1972. The 1972 conversion factor (the last year for which a conversion factor was reported for Alaska) was used for 1973 through 1978. According to industry sources, new mines were opened in 1978 and a more representative factor was used for 1979 through 1997. For 1998 forward, the Alaska factor is calculated using the same methodology as used for other States described on page 17.

Data Sources for Coal

CLACKZZ — Factor for converting coal consumed by the transportation sector from physical units to Btu by State.

- 1960 through 1977: Assumed by EIA to be equal to the Btu conversion factor for bituminous coal and lignite consumption by industrial users other than coke plants:
  - — 1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed by industrial users other than coke plants by the ratios of 1960 through 1973 national averages for the other industrial users to its 1974 average.
  - — 1974 through 1977: Calculated by EIA by assuming that the bituminous coal and lignite consumed by industrial users other than coke plants in each State contained heating values equal to those of bituminous coal and lignite received at electric utilities in each State from identified coal-producing districts as reported on Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to other industrial users in each State and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1978 forward: Transportation sector coal is included in the other industrial category. Zero is entered for this variable.

CLACPUS — Coal consumed by the transportation sector in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, chapter "Coal-Bituminous and Lignite," table titled, "Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States," column "Bunker, lake vessel and foreign."
- 1976 and 1977: EIA, *Energy Data Reports*, "Coal-Bituminous and Lignite," table titled, "Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States," column "Bunker, lake vessel and foreign."
- 1978 forward: Small amounts of bituminous coal and lignite consumed by the transportation sector are included in the other industrial category (see CLOCPUS). Zero is entered for this variable.

CLEIKZZ — Factor for converting coal consumed by the electric power sector from physical units to Btu by State.

- 1960 through 1988: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS.
  Anthracite conversion factors:
  - — 1960 through 1972: EIA assumed that all anthracite consumed at electric utilities was recovered from culm banks and river dredging and was estimated to have an average heat content of 17.500 million Btu per short ton.
  - — 1973 through 1988: Calculated annually by EIA by dividing the heat content of anthracite receipts at electric utilities by the quantity of anthracite received at electric utilities. These data are reported on the FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," and predecessor forms.

  Bituminous coal and lignite conversion factors:

— 1960 through 1972: EIA adopted the average thermal conversion factor of the Bureau of Mines, which used the National Coal Association (NCA) average thermal conversion factor for electric utilities calculated from FPC Form 1 and published in *Steam Electric Plant Factors*, an NCA annual report. The specific tables are:
  – 1960 and 1961: Table 1.
  – 1962 through 1972: Table 2.
— 1973 through 1982: The average heat content of coal received at steam electric plant 25 megawatts or greater from FPC Form 423 and published in Btu per pound in EIA, *Cost and Quality of Fuels for Electric Utility Plants*, tables titled "Destination and Origin of Coal 'Delivered to' (1973–1979) 'Receipts to' (1980) 'Received at' (1981–1982) Steam-Electric Plants 25-MW or Greater."
— 1983 through 1988: The average heat content of coal received at steam electric plants 50 megawatts capacity or larger from FERC Form 423 and published in Btu per pound in the EIA, *Cost and Quality of Fuels for Electric Utility Plants.* The specific tables are:
  – 1983 and 1984: Table 58.
  – 1985 through 1988: Table 48.

Note: The State conversion factors for 1960 through 1972 are derived from actual consumption data, while the conversion factors for 1973 to 1988 are based on receipts of coal. The factors for 1960 through 1972 also may include some quantities of anthracite. These breaks in the series create some data discrepancies. In instances where a State had no receipts for a particular year but did report consumption, it is assumed that the coal received in one year is consumed during the following year and the Btu value of the previous year's receipts is used. See Additional Note 4 on page 16 for Alaska calculations.

- 1989 forward: Calculated by dividing the total heat content of coal received at electric power plants (including electric utilities, nonutility power plants and combined heat-and-power plants) by the total quantity consumed in physical units collected on Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html. See Additional Note 4 on page 16 for Alaska factors.

CLEIPZZ — Coal consumed by the electric power sector by State.

- EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

CLHCKZZ — Factor for converting coal consumed by the residential and commercial sectors from physical units to Btu by State.

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:

  — Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for."

  Bituminous coal and lignite conversion factors:

  — 1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed in the residential and commercial sector by the ratios of 1960 through 1973 national averages for the sector to its 1974 average.
  — 1974 through 1997: Calculated by EIA by assuming that the bituminous coal and lignite consumed in the residential and commercial sector in each State contained heating values equal to those of bituminous coal and lignite received at electric utilities in each State from identified coal-producing districts as reported on the FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to the residential and commercial sector in each State and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1998 through 2000: Calculated by EIA from the average heat content of coal received for the residential and commercial sectors combined as reported on Form EIA-860, "Annual Electric Generator Report." For States that are not represented in data on the Form EIA-860, it is assumed that the heat content of the coal receipts in residential and commercial sectors are equivalent to the heat content of coal received in the other industrial sector as reported on Form EIA-3A, "Annual Coal Quality Report—Manufacturing." For States that are not

represented in either Form EIA-3A data or Form EIA-860 data (CT, NH, RI, VT and DC), the heat content of coal receipts in MA is used for CT, NH, RI and VT and the heat content of coal receipts in MD is used for DC, since the origin of the coal receipts are similar.

- 2001 through 2007: Calculated by EIA from the coal distribution data reported on Form EIA-6A, "Coal Distribution Report - Annual," and the average heat content of coal reported on FERC Form 423 and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants." Form EIA-6A provides distribution data for the combined residential and commercial sectors by State of origin to the destination State. FERC Form 423 and Form EIA-423 provide the average heat content of coal produced in the State of origin.
- 2008: Calculated by EIA using unpublished data as the average heat content of coal received at commercial and institutional establishments consuming more than 1,000 short tons of coal annually from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users."

CLHCPUS — Coal consumed by the residential and commercial sectors in the United States.

- 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, Chapter "Coal–Pennsylvania Anthracite Annual" and Chapter "Coal–Bituminous and Lignite," Table titled, "Consumption of bituminous coal and lignite, by consumer class, with retail deliveries in the United States" column titled "Retail deliveries to other consumers" or "Retail sales."
- 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 7.
- 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 6.
- 1988 through 1990, 1992 through 1995: EIA, *Quarterly Coal Report, October–December* for each year. Data are from the report of the following year, i.e., 1988 final data are published in the *Quarterly Coal Report, October–December 1989.* The specific tables are:
  - 1988 through 1990: Table 29.
  - 1992 through 1994: Table 51.
  - 1995: Table 43.
- 1991, 1996 through 1999: EIA, *Coal Industry Annual 2000,* Table 75.
- 2000: EIA, *Annual Coal Report 2001*, Table 27.
- 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report,* Table 26, http://www.eia.gov/cneaf/coal/page/acr/table26.html and http://www.eia.gov/cneaf/coal/page/acr/back issues.html..

CLHDPZZ — Coal distributed to the residential and commercial sectors by State.

- 1960 through 1979: No data available. The 1980 State data are used for years 1960 through 1979.
- 1980 forward: The distribution data are published in:
  - 1980 through 1984: EIA, *Coal Distribution, January-December 1984*, Table 21.
  - 1985 through 1989: EIA, *Coal Distribution, January-December 1989*, Table 15.
  - 1990 and 1991: EIA, *Coal Distribution, January-December* for each year, Table 16.
  - 1992 through 1994: EIA, *Quarterly Coal Report, October-December* for the following year, Table 10.
  - 1995 through 1997: Unpublished data from Form EIA-6.
  - 1998 through 2000: EIA, *Coal Industry Annual* for each year, Table 64.
  - 2001 forward: EIA, *Domestic Distribution of U.S. Coal by Destination State, Consumer, Destination and Method of Transportation,* http://www.eia.gov/cneaf/coal/page/coaldistrib/coal_distributions.html.

CLKCKZZ — Factor for converting coal carbonized at coke plants from physical units to Btu by State.

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:
  - Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for."

  Bituminous coal and lignite conversion factors:

— 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite," sum of columns "Beehive coke plants" and "Oven coke plants."
— 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 8.
— 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 7.
— 1988 through 1997: EIA, Unpublished data from Form EIA-5, "Coke Plant Report, Quarterly."

- 1998 through 2000: Calculated by EIA for 1998 using unpublished data from Form EIA-5, "Coke Plant Report, Quarterly." The 1998 State factors are used for 1999 and 2000.
- 2001 forward: Calculated by EIA from data reported on Form EIA-5, "Quarterly Coal Consumption and Quality Report, Coke Plants." Coke plant data on tons of coal carbonized to create coke, the volatilities of the coal carbonized, and conversion factors based on coal volatility are used to calculate average conversion factors by State.

CLKCPUS — Coal carbonized by coke plants in the United States.

- 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, chapter "Coal–Pennsylvania Anthracite Annual," and chapter "Coal–Bituminous and Lignite," table titled, "Consumption of Bituminous coal and lignite, by consumer class, and retail deliveries in the United States," sum of columns titled "Beehive coke plants" and "Oven coke plants."
- 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 7.
- 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 6.
- 1988 through 1995: EIA, *Quarterly Coal Report, October–December* for each year. Data are from the report of the following year, i.e., 1988 final data are published in the *Quarterly Coal Report, October–December 1989. The specific tables are:*
  — 1988 through 1990: Table 27.
  — 1991 through 1994: Table 48.
  — 1995: Table 40.
- 1996 through 1999: EIA, *Coal Industry Annual 2000,* Table 73.
- 2000: EIA, *Annual Coal Report 2001*, Table 27.
- 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report,* Table 26, http://www.eia.gov/cneaf/coal/page/acr/table26.html and http://www.eia.gov/cneaf/coal/page/acr/back issues.html.

CLKDPZZ — Coal distributed to coke plants by State.

- 1960 through 1979: Series is the sum of an anthracite data series and a bituminous coal and lignite data series:
  Anthracite:
  — No data available. The 1980 State data are used for years 1960 through 1979.
  Bituminous coal and lignite:
  — 1960 through 1976: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite."
  — 1977 through 1979: EIA, *Energy Data Reports*, "Coal-Bituminous and Lignite." The specific tables are:
    - 1977: "Comparative Summary of Distribution of Bituminous Coal and Lignite Produced in the United States During the First Nine Months of 1977" and "Distribution of Bituminous Coal and Lignite Produced in the United States During October-December 1977, by Geographic Division and State Destination."
    - 1978: "Distribution of Bituminous Coal and Lignite Produced in the United States."
    - 1979: "Overall Summary of Distribution of Bituminous, Subbituminous, and Lignite Coal Produced in the United States."
- 1980 forward: Consumption data became available for some States and are used for this distribution series when available. See Additional Note 1 on page 15 for an explanation of the estimation methodology.
  — 1980 through 1995: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1982 final data are published in the *Quarterly Coal Report, October-December 1983*. The specific tables are:
    - 1980: Unpublished data.
    - 1981 through 1983: Table 25.
    - 1984, 1985, and 1987: Table 27.
    - 1986, 1988, and 1989: Unpublished State revisions that are components of the U.S. revisions published in the *Quarterly Coal Report, October-December 1991,* Table 45.
    - 1990: Table 27.
    - 1991 through 1994: Table 48.

  - 1995: Table 40.
- — 1996 through 1999: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Coal Industry Annual 2000,* Table 73.
- — 2000: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report 2001*, Table 27.
- — 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report,* Table 26, http://www.eia.gov/cneaf/coal/page/acr/table26.html and http://www.eia.gov/cneaf/coal/page/acr/backissues.html. EIA, *Domestic Distribution of U.S. Coal by Destination State, Consumer, Destination and Method of Transportation,* http://www.eia.gov/cneaf/coal/page/coaldistrib/coal_distributions.html.

CLOCKZZ — Factor for converting coal consumed by industrial users other than coke plants from physical units to Btu by State.

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS.

  Anthracite conversion factors:
  - — Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for."

  Bituminous coal and lignite conversion factors:
  - — 1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed by industrial users other than coke plants by the ratios of 1960 through 1973 national averages for the other industrial users to its 1974 average.
  - — 1974 through 1997: Calculated by EIA by assuming that the bituminous coal and lignite consumed by industrial users other than coke plants in each State contained heating values equal to those of bituminous coal and lignite received at electric utilities in each State from identified coal-producing districts as reported on FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to other industrial users in each State and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1998 through 2000: Calculated by EIA from unpublished data as the average heat content of coal received at manufacturing plants (other than coke plants) consuming more than 1,000 short tons of coal reported on Form EIA-3A, "Annual Coal Quality Report—Manufacturing Plants."
- 2001 forward: Calculated by EIA using unpublished data as the average heat content of (1) coal received at manufacturing plants (other than coke plants) consuming more than 1,000 short tons of coal annually from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users," and predecessor forms; (2) coal distributed to agricultural, mining, and construction sectors reported on Form EIA-6A, "Coal Distribution Report - Annual" with heat contents for the coal producing State reported on FERC Form 423 and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants" (discontinued after 2007); and (3) coal consumed by coal mining facilities reported on Form EIA-7A, "Coal Production Report," with heat contents for the coal producing State reported on Form EIA-923, "Power Plant Operations Report," and predecessor forms.

CLOCPUS — Coal consumed by industrial users other than coke plants in the United States.

- 1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, Chapter "Coal–Pennsylvania Anthracite, Annual" and chapter "Coal–Bituminous and Lignite," table titled "Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States." Sum of columns titled "Steel and rolling mills," "Cement mills," and "Other manufacturing and mining industries."
- 1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 7.
- 1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 6.

- 1988 through 1999: EIA, *Quarterly Coal Report, October–December* for each year. Data are from the report of the following year, i.e., 1988 final data are published in the *Quarterly Coal Report, October–December 1989*. The specific tables are:
  - — 1988 through 1990: Table 28.
  - — 1991 through 1994: Table 49.
  - — 1995: Table 41.
  - — 1996 through 1999: Table 42.
- 2000: EIA, *Annual Coal Report 2001*, Table 27.
- 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report,* Table 26, http://www.eia.gov/cneaf/coal/page/acr/table26.html and http://www.eia.gov/cneaf/coal/page/acr/back issues.html.

CLODPZZ — Coal distributed to industrial plants (other than coke plants) by State.

- 1960 through 1979: Series is the sum of an anthracite data series and a bituminous coal and lignite data series:
  Anthracite:
  - — No data available. The 1980 State data are used for years 1960 through 1979.

  Bituminous coal and lignite:
  - — 1960 through 1976: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coal–Bituminous and Lignite."
  - — 1977 through 1979: EIA, *Energy Data Reports*, "Coal-Bituminous and Lignite." The specific tables are:
    - 1977: "Comparative Summary of Distribution of Bituminous Coal and Lignite Produced in the United States During the First Nine Months of 1977" and "Distribution of Bituminous Coal and Lignite Produced in the United States During October-December 1977, by Geographic Division and State Destination."
    - 1978: "Distribution of Bituminous Coal and Lignite Produced in the United States."
    - 1979: "Overall Summary of Distribution of Bituminous, Subbituminous, and Lignite Coal Produced in the United States."
- 1980 forward: Consumption data became available for some States and are used for this distribution series when available. See Additional Note 1 on page 15 for an explanation of the estimation methodology.
  - — 1980 through 1995: EIA, *Quarterly Coal Report, October-December* for each year. Data are from the report of the following year, i.e., 1982 final data are published in the *Quarterly Coal Report, October-December 1983*. The specific tables are:
    - 1980: Unpublished data.
    - 1981 through 1983: Table 26.
    - 1984 through 1990: Table 28.
    - 1991 through 1994: Table 49.
    - 1995: Table 41.
  - — 1996 through 1999: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Coal Industry Annual 2000,* Table 71.
  - — 2000: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report 2001*, Table 27.
  - — 2001 forward: EIA, unpublished data in short tons as published rounded to thousand short tons in EIA, *Annual Coal Report,* Table 26, http://www.eia.gov/cneaf/coal/page/acr/table26.html and http://www.eia.gov/cneaf/coal/page/acr/back issues.html.

CLRCSUS — Residential sector share of coal consumed by the residential and commercial sectors combined.

- 1960 forward: Calculated by EIA. It is first assumed that an occupied coal-heated housing unit consumes fuel at the same Btu rate as an oil-heated housing unit. Then, for the years in which data are available on the number of occupied housing units by heating source (1960, 1970, 1973 through 1981, and subsequent odd-numbered years), residential use of coal is estimated by the following steps: a ratio is created of the number of occupied housing units heated by coal to the number of housing units heated by oil; the ratio is multiplied by the Btu quantity of distillate fuel oil used by the residential sector to estimate the Btu quantity of coal used by the residential sector; and the residential sector's share of residential and commercial use is calculated. The missing years' shares are interpolated.

Net Imports of Coal Coke

Physical Units

Net imports of coal coke is a component of total U.S. energy consumption. There is no attempt to estimate State allocations of this energy source and all of it is considered to be used by the industrial sector. Net imports of coal coke are included in the U.S. data but not in the State-level data in all tables of total energy consumption and industrial sector energy consumption. Variables for net imports of coal coke into the United States are:

CCIMPUS = coal coke imported into the United States, in thousand short tons; and
CCEXPUS = coal coke exported from the United States, in thousand short tons.

Net imports is calculated:

CCNIPUS = CCIMPUS – CCEXPUS

British Thermal Units (Btu)

The factor for converting coal coke from short tons to Btu is 24.80 million Btu per short ton:

CCIMBUS = CCIMPUS * 24.80
CCEXBUS = CCEXPUS * 24.80
CCNIBUS = CCIMBUS – CCEXBUS

Data Sources for Net Imports of Coal

CCEXPUS — Coal coke exported from the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coke and Coal Chemicals Annual."
- 1976 through 1979: EIA, *Energy Data Reports*, "Coke and Coal Chemicals Monthly."
- 1980 through 1990: EIA, *Quarterly Coal Report* (October–December of the following year). The specific tables are:
  - — 1980: Table 7.
  - — 1981 through 1984: Table A10.
  - — 1985 through 1990: Table A9.
- 1991 and 1992: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System.
- 1993 through 1997: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System, as published rounded in the EIA, *Quarterly Coal Report October–December 1999*, Table 2.
- 1998 forward: EIA, *Quarterly Coal Report* (October–December of the following year), Table 15 (1998 and 1999), Table 16 (2000), Table 17 (2001 through 2005), and Table 14 (2006 forward), http://www.eia.gov/FTPROOT/coal/qcrhistory.htm.

CCIMPUS — Coal coke imported into the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coke and Coal Chemicals Annual."
- 1976 through 1979: EIA, *Energy Data Reports*, "Coke and Coal Chemicals Monthly."
- 1980 through 1990: EIA, *Quarterly Coal Report* (October–December of the following year). The specific tables are:
  - — 1980: Table 8.
  - — 1981 through 1984: Table A12.
  - — 1985 through 1987: Table A11.
  - — 1988 through 1990: Table A10.
- 1991 and 1992: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System.
- 1993 through 1997: Unpublished revisions from the EIA, Office of Energy Markets and End Use, Integrated Modeling Data System, as published rounded in the EIA, *Quarterly Coal Report October–December 1999*, Table 2.
- 1998 forward: EIA, *Quarterly Coal Report* (October–December of the following year), Table 19 (1998 and 1999), Table 20 (2000), Table 21 (2001 through 2005), and Table 18 (2006 forward), http://www.eia.gov/FTPROOT/coal/qcrhistory.htm.

Section 3. Natural Gas

Physical Units

Eight natural gas data series are used to derive the natural gas consumption estimates in the State Energy Data System (SEDS). Four of these data series are deliveries of natural gas to the end user by State and are used as consumption because actual consumption data at these levels are not available. The sources for the natural gas data are the *Natural Gas Annual* and *Electric Power Annual* published by the U.S. Energy Information Administration (EIA) and its predecessors. Data for recent years are also available via EIA's Natural Gas Navigator on the Internet. These series, in million cubic feet, for each State are as follows (the two-letter State code is represented by "ZZ" in the following variable names):

NGCCPZZ = natural gas delivered to the commercial sector (includes gas used by nonmanufacturing organizations, such as hotels, restaurants, retail stores, laundries, and other service enterprises) plus natural gas delivered to other consumers (includes deliveries to municipalities and public authorities for institutional heating and street lighting). Prior to 1996, includes gas used in agriculture, forestry, and fisheries;
NGEIPZZ = natural gas consumed by the electric power sector;
NGINPZZ = a portion of the natural gas delivered to the industrial sector (includes gas used as fuel and feedstock in chemical plants and to produce carbon black). Beginning in 1996, includes gas used in agriculture, forestry, and fisheries;
NGLEPZZ = natural gas consumed as lease fuel;
NGPLPZZ = natural gas consumed as plant fuel;
NGPZPZZ = natural gas consumed as pipeline fuel;
NGRCPZZ = natural gas delivered to the residential sector; and
NGVHPZZ = natural gas consumed as vehicle fuel.

The U.S. totals of these independent variables are calculated as the sum of the States' values.

The data are combined into the four major end-use sectors used in SEDS as closely as possible. However, natural gas data are collected using different aggregations of users. The industrial sector in SEDS is intended to contain energy used in agriculture, forestry, and fisheries. For natural gas, these categories are reported with commercial use of natural gas through 1995 and in the industrial sector for 1996 forward. These data cannot be separately identified and no adjustment for this end-use inconsistency is made in SEDS.

The residential sector's consumption of natural gas is represented by the variable for deliveries to the residential sector, NGRCPZZ.

The commercial sector's consumption of natural gas is represented by the variable for deliveries to the commercial sector, NGCCPZZ.

The industrial sector's consumption of natural gas in SEDS, NGICPZZ, is estimated to be the sum of natural gas delivered to the industrial sector, NGINPZZ, natural gas consumed as lease fuel, NGLEPZZ, and natural gas consumed as plant fuel, NGPLPZZ. SEDS contains lease and plant fuel data combined for 1960 through 1982; the combined data series is stored as NGLEPZZ. Beginning in 2001, Federal Offshore natural gas lease fuel for Alabama, Louisiana, and Texas are reported combined. See "Additional Notes" on page 25 for the method of estimating the individual State values.

NGICPZZ = NGINPZZ + NGLEPZZ + NGPLPZZ

The transportation sector's consumption of natural gas, NGACPZZ, is the sum of natural gas consumed in pipeline operations, primarily in compressors, NGPZPZZ, and natural gas consumed as vehicle fuel, NGVHPZZ. Prior to 1990, the small amounts of natural gas consumed as vehicle fuel are included in the commercial sector consumption and cannot be identified separately; therefore, NGVHPZZ is zero prior to 1990.

NGACPZZ = NGPZPZZ + NGVHPZZ

Electric power sector's consumption of natural gas is represented by the data series NGEIPZZ.

The total consumption of natural gas, estimated for each State, is the sum of the consumption by the end-use sectors and for electricity generation:

NGTCPZZ = NGRCPZZ + NGCCPZZ + NGICPZZ + NGACPZZ + NGEIPZZ

The U.S. consumption estimates for each of the sectors and the U.S. total are calculated as the sum of the States' values.

British Thermal Units (Btu)

Three factors for each State are used for converting the consumption of natural gas from its physical units of million cubic feet into thousand Btu per cubic foot. Two of these State-level factors are:

NGEIKZZ = The factor for converting natural gas consumed by the electric power sector from physical units to Btu; and
NGTCKZZ = The factor for converting natural gas consumed by all sectors from physical units to Btu.

These two factors are used to derive a third factor, NGTXKZZ, for converting natural gas used by all sectors other than electric power from physical units to Btu:

NGTCBZZ = NGTCPZZ * NGTCKZZ
NGEIBZZ = NGEIPZZ * NGEIKZZ
NGTXKZZ = (NGTCBZZ – NGEIBZZ) / (NGTCPZZ – NGEIPZZ)

Natural gas consumption in Btu for the residential, commercial, industrial, and transportation sectors in each State is calculated by multiplying the physical unit data by the factor NGTXKZZ, such as:

NGACBZZ = NGACPZZ * NGTXKZZ
NGCCBZZ = NGCCPZZ * NGTXKZZ

The U.S. consumption estimates in Btu for each of the sectors and the U.S. total are calculated as the sum of the States' Btu values, such as:

NGTCBUS = ΣNGTCBZZ
NGEIBUS = ΣNGEIBZZ
NGACBUS = ΣNGACBZZ
NGCCBUS = ΣNGCCBZZ

Prior to 1972, conversion factors for natural gas consumed for electricity generation were not collected; therefore, the factor for all natural gas consumed (NGTCKZZ) is used for electric power (NGEIKZZ) and for the other sectors (NGTXKZZ) for 1963 through 1971. Prior to 1963, State-level conversion factors for natural gas consumption were not collected and a standard factor of 1.035 thousand Btu per cubic foot is used for all sectors in all States.

Supplemental Gaseous Fuels

Natural gas consumption contains a small amount of supplemental gaseous fuels (SGF). These fuels are introduced into or commingled with natural gas, and increase the volume available for disposition. Such fuels include, but are not limited to, synthetic natural gas, propane-air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas. Because SGF are mostly derived from fossil fuels, which are already accounted for, they are removed from total energy consumption in Btu (see Sections 6 and 7) to eliminate any double counting.

Annual data on SGF supplies in physical units are available for each State from 1980 forward in EIA's *Natural Gas Annual*. For all States except North Dakota, this data series is used to approximate SGF contained in the natural gas delivered to users. See "Additional Note 2" on page 26 for the method of assigning North Dakota SGF supplies to North Dakota and other States for consumption. Unknown quantities of SGF are included in the Btu consumption data for 1979 and earlier years.

NGSFPZZ = supplemental gaseous fuels supplies by State in million cubic feet.

It is assumed that SGF are commingled with natural gas consumed by the commercial, other industrial, residential, and electric power sectors, but are not commingled with natural gas used for lease and plant fuel,

pipelines, or vehicle fuel. The estimated consumption of SGF within each sector is calculated using the sector's natural gas consumption share.

NGTZPZZ = NGCCPZZ + NGINPZZ + NGRCPZZ + NGEIPZZ

SFCCPZZ = NGSFPZZ * (NGCCPZZ / NGTZPZZ)
SFINPZZ = NGSFPZZ * (NGINPZZ / NGTZPZZ)
SFRCPZZ = NGSFPZZ * (NGRCPZZ / NGTZPZZ)
SFEIPZZ = NGSFPZZ * (NGEIPZZ / NGTZPZZ)

To convert SGF from physical units to Btu, the appropriate natural gas conversion factors are used:

SFCCBZZ = SFCCPZZ * NGTXKZZ
SFINBZZ = SFINPZZ * NGTXKZZ
SFRCBZZ = SFRCPZZ * NGTXKZZ
SFEIBZZ = SFEIPZZ * NGEIKZZ

Total SGF consumed by State in Btu is equal to the sum of the four sectors with SGF:

SFTCBZZ = SFCCBZZ + SFINBZZ + SFRCBZZ + SFEIBZZ

The U.S. consumption estimates for each of the variables and sectors and the U.S. total are calculated as the sum of the States' values.

Natural gas excluding supplemental gaseous fuels in Btu

To facilitate data users who prefer the double-counting of SGF be removed from natural gas, a set of variables is introduced for consumption of natural gas excluding supplement gaseous fuels in Btu:

NNACBZZ = NGACBZZ
NNCCBZZ = NGCCBZZ - SFCCBZZ
NNICBZZ = NGICBZZ - SFINBZZ
NNRCBZZ = NGRCBZZ - SFRCBZZ
NNEIBZZ = NGEIBZZ - SFEIBZZ
NNTCBZZ = NGTCBZZ - SFTCBZZ

The U.S. total consumption is calculated as the sum of the States' values.

Additional Calculations

Although SEDS does not use U.S.-level conversion factors for calculating natural gas consumption, these factors are calculated by SEDS for reference and are shown in the natural gas tables in Appendix B, http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html:

NGEIKUS = NGEIBUS / NGEIPUS
NGTCKUS = NGTCBUS / NGTCPUS
NGTXKUS = (NGTCBUS – NGEIBUS) / (NGTCPUS – NGEIPUS)

To produce price and expenditure data, SEDS differentiates between natural gas used in the transportation sector as pipeline fuel, which is not sold and has no price, and natural gas purchased and consumed as vehicle fuel. SEDS also differentiates between natural gas used as lease and plant fuel by the natural gas industry, which is not costed, and natural gas purchased by industrial consumers. Btu values for the price and expenditure tables are calculated in SEDS as follows:

NGPZBZZ = NGPZPZZ * NGTXKZZ
NGVHBZZ = NGVHPZZ * NGTXKZZ
NGLPPZZ = NGLEPZZ + NGPLPZZ
NGLPBZZ = NGLPPZZ * NGTXKZZ

The U.S. totals for each series are calculated as the sum of the States' values.

Additional Notes

1. Beginning with 2001 data, Federal Offshore natural gas lease fuel consumption for Alabama, Louisiana, and Texas is reported combined under "Gulf of Mexico" in the source publication. To estimate each State's portion, data from the U.S. Minerals Management Service on natural gas production for the Eastern Gulf, Central Gulf, and Western Gulf areas are totaled. Alabama's share of the Gulf of Mexico lease fuel consumption is calculated in proportion to the Eastern Gulf's share of the production total; Louisiana's share is the same proportion as the Central Gulf share, and the Texas share is in proportion to the Western Gulf share.

2. In general, SGF supplies are small relative to total natural gas consumption, and are assumed to be a good measure of SGF consumption. The only exception is North Dakota. Since 1985, North Dakota's volume of SGF supplies is significant and sometimes exceeds its total natural gas consumption. SEDS assumes that 10 percent of SGF produced in North Dakota is consumed in the State and the rest is distributed to Iowa, Illinois, and Indiana through the Northern Border Pipeline, according to the capacity of the pipeline going into each State. The percentage allocations of the supplemental gaseous fuels supplies in North Dakota are as follows:
   - From 1985 through 1998: North Dakota (10%), Iowa (90%).
   - From 1999 forward: North Dakota (10%), Iowa (62%), Illinois (22%), Indiana (6%).

Data Sources

NGCCPZZ — Natural gas delivered to the commercial sector and to other consumers (municipalities and public authorities for institutional heating and street lighting), including natural gas consumed as vehicle fuel through 1989 and natural gas used in agriculture, forestry, and fisheries through 1995, by State.

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Natural Gas Production and Consumption," table titled "Number of consumers and volume of natural gas consumed by principal users in the United States," column "Commercial."
- 1967 through 1988: EIA, *Historical Natural Gas Annual 1930 Through 2000*, Table 16, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga_historical.html.
- 1989 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vcs_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

NGEIKZZ — Factor for converting natural gas consumed by the electric power sector from physical units to Btu by State.

- 1960 through 1971: Assumed by the EIA to be equal to the thermal conversion factor for the consumption of natural gas by all users (NGTCKZZ).
- 1972 through 1982: Calculated annually by EIA by dividing the total heat content of natural gas received at steam electric plants 25 megawatts or greater by the total quantity received at those electric plants. The heat contents and quantities received are from the FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants."
- 1983 through 1988: The average heat content of natural gas received at steam electric plants 50 megawatts capacity or larger from FERC Form 423 and published from 1993 forward in Btu per cubic foot in the EIA, *Cost and Quality of Fuels for Electric Utility Plants,* Table 14, http://www.eia.gov/cneaf/_electricity/cq/cq_sum.html. Note: For States that reported consumption on EIA-759 but were not large enough to report on FERC Form 423, factors were estimated by using previous years' factors or the factor for total natural gas consumption in the State.
- 1989 forward: Calculated by dividing the total heat content of natural gas received at electric power plants (including electric utilities, nonutility power plants and combined heat-and-power plants) by the total quantity consumed in physical units collected by the EIA on Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

NGEIPZZ — Natural gas consumed by the electric power sector by State.

- 1960 through 1975: Federal Power Commission, News Release, "Power Production, Fuel Consumption, and Installed Capacity Data," table titled "Consumption of Fuel by Electric Utilities for Production of Electric Energy by State, Kind of Fuel, and Type of Prime Mover," sum of columns, "steam and gas turbine" and "internal combustion" under column heading "gas."
- 1976 through 1981: EIA, *Electric Power Annual* (1981), Table 67.
- 1982 through 1986: Unrounded data as published in rounded form in EIA, *Electric Power Annual, 1986*, Table 14.
- 1987: Unrounded data as published in rounded form in EIA, *Electric Power Annual 1988*, Table 13.
- 1988: Unrounded data as published in rounded form in EIA, *Electric Power Annual 1989*, Table 19.
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

NGINPZZ — A portion of the natural gas delivered to the industrial sector, including natural gas used in agriculture, forestry, and fisheries beginning in 1996, by State.

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Natural Gas Production and Consumption," table titled "Number of consumers and volume of natural gas consumed by principal users in the United States." Sum of data in columns "Carbon black," "Refinery fuel," and "Other industrial fuel" (which includes electric utility fuel) minus data in column "Fuel used at electric utility plants."
- 1967 through 1992: EIA, *Historical Natural Gas Annual 1930 Through 2000*, Table 16, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga_historical.html.
- 1993 through 1996: Unpublished data comparable to data contained in the *Natural Gas Annual,* State Summaries tables.
- 1997 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vin_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

NGLEPZZ — Natural gas consumed as lease fuel by State (includes natural gas consumed as plant fuel in 1960 through 1990).

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, Natural Gas chapter. State data are not available from 1960 through 1966, although U.S. totals are available. State estimates were calculated by apportioning the U.S. totals to the States on the basis of each State's share of the U.S. total in 1967.
- 1967 through 1982: EIA, *Natural Gas Annual 1994 Volume II*, Table 14.
- 1983 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vcl_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

NGPLPZZ — Natural gas consumed as plant fuel by State.

- 1960 through 1982: Included with natural gas consumed as lease fuel (see NGLEPZZ).
- 1983 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_VCF_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

NGPZPZZ — Natural gas consumed as pipeline fuel by State.

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Natural Gas Production and Consumption," table titled "Number of consumers and volume of natural gas consumed by principal users in the United States," column "Used as pipeline fuel."
- 1967 through 1992: EIA, *Natural Gas Annual 1994 Volume II*, Table 14.
- 1993 through 1996: EIA, *Historical Natural Gas Annual 1930 Through 2000*, Table 15. This report is available only via the Internet at http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html.
- 1997 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vgp_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

NGRCPZZ — Natural gas delivered to the residential sector, used as consumption, by State.

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Natural Gas Production and Consumption," table titled "Number of consumers and volume of natural gas consumed by principal users in the United States," column "Residential."
- 1967 through 1988: EIA, *Historical Natural Gas Annual 1930 Through 2000*, Table 16, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga_historical.html.
- 1989 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vrs_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

NGSFPZZ ---- Supplemental gaseous fuels supplies by State.

- 1980 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_prod_ss_a_EPG0_ovi_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, Table 8.

NGTCKZZ — Factor for converting natural gas consumed by all users from physical units to Btu by State.

- 1960 through 1962: EIA adopted the thermal conversion factor of 1,035 Btu per cubic foot as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

- 1963 through 1979: EIA adopted the thermal conversion factors calculated annually by the American Gas Association (AGA) and published in *Gas Facts*, an AGA annual.
- 1980 through 1996: EIA, *Historical Natural Gas Annual 1930 Through 2000*, Table 16, http://www.eia.gov/oil_gas/ natural_gas/data_publications/historical_natural_gas_annual/hnga.html.
- 1997 forward: EIA, *Natural Gas Annual*, Table 16, http://www.eia.gov/oil_gas/natural_gas/data_publications/natural_gas_annual/nga_historical.html and unpublished revisions.

NGVHPZZ — Natural gas delivered for use as vehicle fuel by State.

- 1960 through 1989: Included in natural gas consumed by the commercial sector (See NGCCPZZ).
- 1990 through 1991: EIA, *Historical Natural Gas Annual 1930 Through 2000,* Table 16, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html.
- 1992 through 2000: EIA, unpublished data from the Office of Coal, Nuclear, Electric and Alternate Fuels (U.S. totals for 1992 forward and State values for 1997 forward) and from the Office of Energy Markets and End Use (State values for 1992 through 1996).
- 2001 forward: EIA, Natural Gas Navigator, http://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vdv_mmcf_a.htm and published in the EIA, *Natural Gas Annual*, State Summaries tables.

Section 4. Petroleum

Petroleum Overview

The 25 petroleum products included in the State Energy Data System (SEDS) are explained in this section. For 10 of these products, the means of estimating their individual consumption by State is described in individual sections. The 10 petroleum products are:

- asphalt and road oil (AR)
- aviation gasoline (AV)
- distillate fuel oil (DF)
- jet fuel (JF)
- kerosene (KS)
- liquefied petroleum gases (LG)
- lubricants (LU)
- motor gasoline (MG)
- petroleum coke (PC)
- residual fuel oil (RF)

The remaining 15 products are described in the section "Other Petroleum Products" and include the following:

- crude oil, including lease condensate (CO)
- miscellaneous petroleum products (MS)
- natural gasoline (NA) (including isopentane)
- petrochemical feedstocks, naphtha less than 401° F (FN)
- petrochemical feedstocks, other oils equal to or greater than 401° F (FO)
- petrochemical feedstocks, still gas (FS)
- plant condensate (PL)
- pentanes plus (PP)
- special naphthas (SN)
- still gas (SG)
- unfractionated stream (US)
- waxes (WX)
- unfinished oils (UO)
- motor gasoline blending components (MB)
- aviation gasoline blending components (AB)

The last petroleum documentation section, "Petroleum Summaries," describes how the 25 petroleum products are combined for each major end-use sector's estimated consumption.

Table TN3 summarizes the petroleum products' end-use assignments in SEDS. Shown in this table are the first four letters of the seven-letter variable names used to identify all energy sources. The first two letters identify the petroleum product and the next two letters identify the end-use sector. For example, the table shows that the aviation gasoline estimated to be consumed by the transportation sector is all aviation gasoline consumed, and that there is some estimated consumption of lubricants in the industrial and transportation sectors, while distillate fuel oil is consumed in every sector.

Asphalt and Road Oil

Physical Units

There are no State-level consumption data for asphalt and road oil available. Therefore, the State-level sales data are used to apportion the national consumption numbers to the States.

The asphalt and road oil sales data are in short tons, while the consumption data are in thousand barrels. Because the sales data are used only for

Table TN3. Summary of Petroleum Products in the State Energy Data System

Petroleum Products	Residential Sector Estimated Consumption (RC)		Commercial Sector Estimated Consumption (CC)		Industrial Sector Estimated Consumption (IC)		Transportation Sector Estimated Consumption (AC)		Electric Power Sector Estimated Consumption (EI)		Total Estimated Consumption (TC)
Asphalt and Road Oil (AR)					ARIC					=	ARTC
					+						+
Aviation Gasoline (AV)							AVAC			=	AVTC
							+				+
Distillate Fuel Oil (DF)	DFRC	+	DFCC	+	DFIC	+	DFAC	+	DFEI	=	DFTC
	+		+		+		+		+		+
Jet Fuel (JF)							JFAC		JFEU	=	JFTC
							+				+
Kerosene (KS)	KSRC	+	KSCC	+	KSIC					=	KSTC
	+		+		+						+
Liquefied Petroleum Gases (LG)	LGRC	+	LGCC	+	LGIC	+	LGAC			=	LGTC
					+		+				+
Lubricants (LU)			+		LUIC		LUAC			=	LUTC
					+		+				+
Motor Gasoline (MG)			MGCC		MGIC		MGAC			=	MGTC
			+		+		+				+
Residual Fuel Oil (RF)			RFCC		RFIC	+	RFAC	+	RFEI	=	RFTC
					+				+		+
Other Petroleum Products (PO)			PCCC[1]	+	POIC[2]			+	PCEI[1]	=	POTC
Total Petroleum (PA)	PARC	+	PACC	+	PAIC	+	PAAC	+	PAEI	=	PATC

[1] "Other petroleum products" are consumed in the industrial sector with the exception of petroleum coke consumed by the commercial and electric power sectors.

[2] "Other petroleum products" consumed by the industrial sector comprises crude oil, including lease condensate; unfinished oils; plant condensate; aviation gasoline and motor gasoline blending components; natural gasoline; petrochemical feedstocks (naphtha less than 401° F, other oils equal to or greater than 401° F, and still gas); pentanes plus; special naphthas; still gas; unfractionated stream; waxes; miscellaneous petroleum products; and petroleum coke for industrial use.

apportioning the U.S. consumption data to the States, they do not need to be converted into thousand barrels.

The four data series that are used to estimate consumption of asphalt and road oil are ("ZZ" in the variable name represents the two-letter State code that differs for each State):

ASINPZZ = asphalt sold for use in the industrial sector of each State, in short tons (includes road oil from 1981 forward);
ASTCPUS = asphalt total consumed in the United States, in thousand barrels (includes road oil from 1983 forward);
RDINPZZ = road oil sold for use in the industrial sector of each State, in short tons (no data from 1983 forward); and
RDTCPUS = road oil total consumed in the United States, in thousand barrels (no data from 1983 forward).

All asphalt and road oil consumption are assigned to the industrial sector because they are used in construction activity. ASTCPUS represents total U.S. consumption of asphalt, and RDTCPUS represents total U.S. consumption of road oil. Both are the "product supplied" data series in the publication *Petroleum Supply Annual,* published by the U.S. Energy Information Administration (EIA). Beginning in 1983, asphalt product supplied includes road oil, and RDTCPUS is entered as zero in SEDS.

ASINPZZ represents all asphalt sold as paving products, as roofing products, and for all other uses. RDINPZZ represents all sales of road oil. These data are collected and published by the Asphalt Institute. Values for RDINPZZ for 1981 and 1982 are estimated as described under "Additional Notes" in this section. Beginning with 1983 data, when road oil is included in asphalt product supplied data in the source publication, RDINPZZ is entered as zero in SEDS.

To calculate State consumption estimates of asphalt, total sales of asphalt and road oil in the United States to the industrial sector are first calculated as the sum of the State data:

ASINPUS = ΣASINPZZ
RDINPUS = ΣRDINPZZ

Each State's consumption of asphalt in the industrial sector (ASICPZZ) is calculated to be in proportion to each State's sales:

ASICPZZ = (ASINPZZ / ASINPUS) * ASTCPUS
ASICPUS = ΣASICPZZ

RDICPZZ = (RDINPZZ / RDINPUS) * RDTCPUS
RDICPUS = ΣRDICPZZ

Since all consumption of asphalt and road oil are assumed to be in the industrial sector, their total consumption in each State equals the industrial sector consumption:

ASTCPZZ = ASICPZZ
RDTCPZZ = RDICPZZ

Asphalt and road oil consumption are added together:

ARICPZZ = ASICPZZ + RDICPZZ
ARICPUS = ΣARICPZZ
ARTCPZZ = ASTCPZZ + RDTCPZZ
ARTCPUS = ΣARTCPZZ

British Thermal Units (Btu)

Asphalt and road oil have a heat content value of approximately 6.636 million Btu per barrel. This factor is applied to convert asphalt and road oil estimated consumption from physical units to Btu:

ARICBZZ = ARICPZZ * 6.636
ARICBUS = ΣARICBZZ

Because all asphalt and road oil are assumed to be used by the industrial sector, total asphalt and road oil consumption in each State and in the United States is assumed to equal the industrial sector consumption:

ARTCBZZ = ARICBZZ
ARTCBUS = ARICBUS

Additional Notes on Asphalt and Road Oil

The Federal Government stopped collecting asphalt and road oil sales data in 1980 and the source for these numbers in recent years has been reports

published by the Asphalt Institute. When companies do not respond to the voluntary survey, the Asphalt Institute does not estimate quantities to compensate for the nonresponse. This can cause large fluctuation in sales from year to year for some States. There is an inherent problem in the methodology of using sales to estimate consumption because asphalt and road oil sold by a producer in one State may be easily transported across State lines and consumed in a neighboring State. The Asphalt Institute acknowledges this problem and estimates that, in any one year, about 15 States may have consumption estimates as much as 20 percent too high or too low.

Asphalt and road oil data for Maryland and the District of Columbia are published combined to avoid disclosure of proprietary data. Prior to being entered into SEDS, the combined data are allocated to each State based on their reported sales in 1974 (99.4 percent to Maryland and 0.6 percent to the District of Columbia) and the assumption that their relative proportions do not change significantly over time.

The EIA report series "Sales of Asphalt," and predecessor reports, which are the source for road oil sales by State (RDINPZZ) in SEDS for 1960 through 1980, was discontinued after the 1980 report. For 1981 and 1982, State estimates of road oil sales were created by first converting the annual total U.S. road oil product supplied data into short tons (one short ton contains 5.5 barrels of road oil). Then, the U.S. total road oil product supplied, in short tons, was disaggregated to each State in proportion to the State's share of total U.S. asphalt sales as reported in the Asphalt Institute's *Report on Sales of Asphalt in the U.S.*

Data Sources for Asphalt and Road Oil

ASINPZZ — Asphalt sold to the industrial sector by State.

- 1960 through 1977: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Sales of Asphalt," the specific tables are:
  - — 1960 through 1962: Table 6.
  - — 1963 through 1977: Table 5.
- 1978 through 1980: EIA, *Energy Data Reports*, "Sales of Asphalt," Table 2.
- 1981 through 1986: The Asphalt Institute, *Asphalt Usage 1987 United States and Canada*, Table B.
- 1987 and 1988: The Asphalt Institute, *Asphalt Usage 1988 United States and Canada*, Tables A and B for State data. *Asphalt Usage 1989 United States and Canada*, page 2 for revised U.S. totals. The Asphalt Institute did not publish corresponding revised State data but did advise EIA on an estimation procedure to adjust 19 State values to sum to the revised U.S. totals.
- 1989 through 1997: The Asphalt Institute, *Asphalt Usage United States and Canada*, table titled "U.S. Asphalt Usage."
- 1998 and 1999: The Asphalt Institute, *Asphalt Usage United States and Canada*, table titled "1998 vs. 1999 U.S. Asphalt Usage." 1998 data for Delaware, New Hampshire, Rhode Island, and Vermont are repeated for 1999 because nonresponse to the survey caused those States data for 1999 to be more than 75 percent lower than their 1998 values.
- 2000 forward: The Asphalt Institute, http://www.asphaltinstitute.org/, *Asphalt Usage Survey for the United States and Canada*, table titled "U.S. Asphalt Usage."

ASTCPUS — Asphalt total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." (Beginning in 1983, this variable includes road oil.) The specific tables are:
  - — 1981 through 2004: Table 2.
  - — 2005 forward: Table 1.

RDINPZZ — Road oil sold to the industrial sector by State.

- 1960 through 1977: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Sales of Asphalt." The specific tables are:
  - — 1960 through 1962: Table 6.
  - — 1963 through 1977: Table 5.
- 1978 through 1980: EIA, *Energy Data Reports*, "Sales of Asphalt," Table 2.
- 1981 and 1982: EIA estimates. (See explanation in "Additional Notes" on page 32.)

- 1983 forward: Road oil is included in asphalt data. Value entered in SEDS as zero.

RDTCPUS — Road oil total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 2.
- 1983 forward: Road Oil is included in asphalt data. Value entered in SEDS as zero.

Aviation Gasoline

Physical Units

The three data series used to estimate consumption of aviation gasoline are:

AVMIPZZ = aviation gasoline issued to the military in each State, in thousand barrels;
AVNMMZZ = aviation gasoline sold to nonmilitary users in each State, in thousand gallons; and
AVTCPUS = aviation gasoline total consumed in the United States, in thousand barrels.

The U.S. Department of Transportation, Federal Highway Administration publishes the nonmilitary aviation gasoline sales data by State (AVNMMZZ) in *Highway Statistics*.

AVMIPZZ is the issues of aviation gasoline to the military in each State and is obtained from the U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center.

Total U.S. consumption of aviation gasoline (AVTCPUS) is the product supplied data series in the publication *Petroleum Supply Annual,* published by the U.S. Energy Information Administration (EIA).

The State-level data series are summed to provide totals for the United States:

AVMIPUS = ΣAVMIPZZ
AVNMMUS = ΣAVNMMZZ

The State sales of nonmilitary aviation gasoline data are converted from thousand gallons to thousand barrels (42 gallons = 1 barrel):

AVNMPZZ = AVNMMZZ / 42

The U.S. nonmilitary sales is the sum of the States' sales:

AVNMPUS = ΣAVNMPZZ

The total sales of aviation gasoline is estimated as the sum of nonmilitary sales and military issues:

AVTTPZZ = AVNMPZZ + AVMIPZZ
AVTTPUS = ΣAVTTPZZ

All aviation gasoline is assumed to be used by the transportation sector. An estimate of aviation gasoline consumption by the transportation sector by State (AVACPZZ) is calculated by assuming that each State consumes aviation gasoline in proportion to the amount sold to that State:

AVACPZZ = (AVTTPZZ / AVTTPUS) * AVTCPUS
AVACPUS = ΣAVACPZZ

Total aviation gasoline consumption in each State, AVTCPZZ, equals the transportation sector consumption in each State:

AVTCPZZ = AVACPZZ

British Thermal Units (Btu)

Aviation gasoline has a heat content value of approximately 5.048 million Btu per barrel. This factor is applied to convert aviation gasoline estimated consumption from physical units to Btu:

AVACBZZ = AVACPZZ * 5.048

AVACBUS = ΣAVACBZZ

Because all aviation gasoline is assumed to be used for transportation, aviation gasoline total consumption in each State and in the United States equals the transportation sector consumption:

AVTCBZZ = AVACBZZ
AVTCBUS = ΣAVTCBZZ

Data Sources for Aviation Gasoline

AVMIPZZ — Aviation fuel issued to the military in the United States by State.

- 1960 through 1974: No data are available. The 1977 data are used for each year.
- 1975 and 1976: No consistent data series are available. The 1977 data are used for both years.
- 1977 through 1988: U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center, Defense Energy Information System, military retail issues based on fiscal year data. The District of Columbia issues are assumed to be zero; therefore, values reported for the District of Columbia are added to Maryland.
- 1989 and 1990: U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center. State data for the fiscal year from two databases are summed: Defense Fuel Automated Management System (military wholesale issues) and Into-Plane Database (military purchases from commercial airports). Into-plane values reported for the District of Columbia are added to Virginia.
- 1991 forward: U.S. Department of Defense, Defense Logistics Agency, Defense Energy Supply Center. State data for the calendar year from two databases are summed: Defense Fuel Automated Management System (military wholesale issues) and Into-Plane Database (military purchases from commercial airports). Into-plane values reported for the District of Columbia are added to Virginia.

AVNMMZZ — Aviation gasoline sold to nonmilitary users by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-24.
- 1965 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.cfm, Table G-24 in 1965 and Table MF-24 in 1966 forward.

AVTCPUS — Aviation gasoline total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

Distillate Fuel Oil

Physical Units

Since State-level and end-use consumption data for distillate fuel oil (except for that consumed by the electric power sector) are not available, sales of distillate fuel oil into or within each State, published by the U.S. Energy Information Administration (EIA) in the *Fuel Oil and Kerosene Sales Report,* are used to estimate distillate fuel oil consumption. The following variable names have been assigned to the sales series, in thousand barrels ("ZZ" in the variable names represents the two-letter State code that differs for each State):

DFBKPZZ = distillate fuel oil sales for vessel bunkering use (i.e., the fueling of commercial or private boats, such as pleasure craft, fishing boats, tugboats, and ocean-going vessels, including vessels operated by oil companies, and fueling for other marine purposes), excluding that sold to the Armed Forces;

DFCMPZZ = distillate fuel oil sales to commercial establishments for space heating, water heating, and cooking;

DFIBPZZ =

distillate fuel oil sales to industrial establishments for space heating and for other industrial use (i.e., for all uses to mines, smelters, plants engaged in producing manufactured products, in processing goods, and in assembling), including farm use;

DFMIPZZ = distillate fuel oil sales to the Armed Forces, for all uses;

DFOCPZZ = distillate fuel oil sales for oil company use, including all fuel oil, crude oil, or acid sludge used as fuel at refineries, by pipelines, or in field operations;

DFOFPZZ = distillate fuel oil sales as diesel fuel for off-highway use in construction (i.e., earthmoving equipment, cranes, stationary generators, air compressors, etc.) and for off-highway uses other than construction (i.e., logging);

DFONPZZ = distillate fuel oil sales as diesel fuel for on-highway use (i.e., as engine fuel for trucks, buses, and automobiles);

DFOTPZZ = distillate fuel oil sales for all other uses not identified in other sales categories;

DFRRPZZ = distillate fuel oil sales to the railroads for use in fueling trains, operating railroad equipment, space heating of buildings, and other operations; and

DFRSPZZ = distillate fuel oil sales to the residential sector for space heating, water heating, and cooking, excluding farm houses.

Three additional data series are used in calculating distillate fuel oil consumption estimates:

DKEIPZZ = distillate fuel oil (including kerosene-type jet fuel before 2001) consumed by the electric power sector, in thousand barrels;

JKEUPZZ = kerosene-type jet fuel consumed by electric utilities, in thousand barrels; and

DFTCPUS = distillate fuel oil total consumed in the United States, in thousand barrels.

Distillate fuel oil consumed by the electric power sector is collected by EIA on Form EIA-923, "Power Plant Operations Report," and predecessor forms. (See Note 4 at the end of this distillate fuel oil section for further information on changes in this series' data definitions.) Before 2001, the data series DKEIPZZ includes kerosene-type jet fuel consumed at electric utilities that is identified as JKEUPZZ. The kerosene-type jet fuel is subtracted from the distillate fuel oil data and accounted for in the jet fuel data described in a following section of this documentation. Data for kerosene-type jet fuel consumed by electric utilities are available for 1972 through 1982 only. Consumption in all other years is assumed to be zero. From 2001 forward, jet fuel consumed by the electric power sector is grouped under waste/other oil and is not accounted for in SEDS. DKEIPZZ is continued to be used to represent distillate fuel oil consumed by the electric power sector.

Total consumption of distillate fuel oil in the United States, DFTCPUS, is the product supplied series in the EIA publication *Petroleum Supply Annual*.

All of the State-level data series listed above are summed to provide totals for the United States.

Next, the variables are combined as closely as possible into the major end-use sectors used in SEDS. The residential sector sales and the commercial sector sales contain only DFRSPZZ and DFCMPZZ, respectively.

The sales of distillate fuel oil to the industrial sector for each State, DFINPZZ, is the sum of the distillate fuel oil sales for industrial use, including industrial space heating and farm use (DFIBPZZ), for oil company use (DFOCPZZ), for off-highway use (DFOFPZZ), and for all other uses (DFOTPZZ). Data for DFOTPZZ are available through 1994. Starting in 1995, consumption is assumed to be zero:

DFINPZZ = DFIBPZZ + DFOCPZZ + DFOFPZZ + DFOTPZZ
DFINPUS = ΣDFINPZZ

The sales of distillate fuel oil to the transportation sector for each State, DFTRPZZ, is the sum of the distillate fuel oil sales for vessel bunkering, military use, railroad use, and the diesel fuel used on-highway:

DFTRPZZ = DFBKPZZ + DFMIPZZ + DFRRPZZ + DFONPZZ
DFTRPUS = ΣDFTRPZZ

Sales of distillate fuel oil to the residential, commercial, industrial, and transportation sectors are added to create a subtotal of sales to all sectors other than the electric utility sector, DFNDPZZ:

DFNDPZZ = DFRSPZZ + DFCMPZZ + DFINPZZ + DFTRPZZ
DFNDPUS = ΣDFNDPZZ

For 2001 forward, consumption of distillate fuel oil by the electric power sector (DFEIPZZ) is the same as the input series DKEIPZZ:

DFEIPZZ = DKEIPZZ

Before 2001, DFEIPZZ is calculated by subtracting the kerosene-type jet fuel consumed by electric utilities from DKEIPZZ:

DFEIPZZ = DKEIPZZ – JKEUPZZ

For all years, the U.S. total for this data series is summed:

DFEIPUS = ΣDFEIPZZ

The estimated U.S. distillate fuel oil consumption by all sectors other than the electric power sector, DFNCPUS, is calculated by subtracting the distillate fuel oil consumption by the electric power sector from the total U.S. distillate fuel oil consumption:

DFNCPUS = DFTCPUS – DFEIPUS

This U.S. subtotal of distillate fuel oil consumption by the four end-use sectors, DFNCPUS, is apportioned to the States by use of the end-use sectors' State-level sales data. The assumption is made that each State consumes distillate fuel oil in proportion to the amount of sales to that State:

DFNCPZZ = (DFNDPZZ / DFNDPUS) * DFNCPUS

The end-use sectors' subtotal for each State, DFNCPZZ, is further divided into estimates for the four end-use sectors in proportion to each sector's sales. The estimated residential sector consumption in each State, DFRCPZZ, is calculated:

DFRCPZZ = (DFRSPZZ / DFNDPZZ) * DFNCPZZ
DFRCPUS = ΣDFRCPZZ

The commercial sector's estimated consumption in each State, DFCCPZZ, is calculated:

DFCCPZZ = (DFCMPZZ / DFNDPZZ) * DFNCPZZ
DFCCPUS = ΣDFCCPZZ

The industrial sector's estimated consumption in each State, DFICPZZ, is calculated:

DFICPZZ = (DFINPZZ / DFNDPZZ) * DFNCPZZ
DFICPUS = ΣDFICPZZ

The transportation sector's estimated consumption in each State, DFACPZZ, is calculated:

DFACPZZ = (DFTRPZZ / DFNDPZZ) * DFNCPZZ
DFACPUS = ΣDFACPZZ

Total State distillate fuel oil consumption is the sum of the end-use sectors' consumption subtotal and the electric power sector consumption:

DFTCPZZ = DFNCPZZ + DFEIPZZ

British Thermal Units (Btu)

Distillate fuel oil has a heat content value of approximately 5.825 million Btu per barrel. This factor is applied to convert distillate fuel oil estimated consumption for the five consuming sectors from physical units to Btu as shown in the following examples:

DFRCBZZ = DFRCPZZ * 5.825
DFCCBZZ = DFCCPZZ * 5.825
DFTCBZZ = DFRCBZZ + DFCCBZZ + DFICBZZ + DFACBZZ + DFEIBZZ

The U.S. Btu consumption estimates are calculated as the sum of all the States' data.

In the State Energy Data consumption tables, "Estimates of Energy Consumption by the Electric Power Sector," the data used in the column headed "Distillate" is the variable DKEIP, which inlcudes keorsene-type jet fuel before 2001, in physical units. The Btu variable, DKEIB, is calculated as follows (See page 43 for description of JKEUB):

DKEIBZZ = DFEIBZZ for 2001 forward
DKEIBZZ = DFEIBZZ + JKEUBZZ before 2001

DKEIBUS = ΣDKEIBZZ

Additional Notes on Distillate Fuel Oil

1. "Deliveries" data are actually called "shipments" in the source document for 1960 and 1961; "consumption" for 1962 through 1966; "shipments" for 1967; "sales" from 1968 through 1978; "deliveries" for 1979 through 1987; and "sales" for 1988 forward.

2. State data for the variables DFONPZZ (on-highway use), DFOFPZZ (off-highway use), and DFOTPZZ (other) for 1967 are unavailable from published sources. These three variables compose the miscellaneous use category for distillate fuel oil, which is known for all years by State. State estimates of DFONPZZ and DFOFPZZ for 1967 were developed by dividing the 1966 values for DFONPZZ and DFOFPZZ by the 1966 total miscellaneous use for each State and applying these percentages to the 1967 total miscellaneous use for each State. The 1967 State estimates for DFOTPZZ are the remainder of the 1967 miscellaneous category after DFONPZZ and DFOFPZZ have been subtracted.

3. In 1979, EIA implemented a new survey form, EIA-172, to obtain deliveries of fuel oil and kerosene data and updated the list of respondents. (A detailed explanation is published in the *Energy Data Report,* "Deliveries of Fuel Oil and Kerosene in 1979.") In this survey form, certain end-use categories were redefined—in many cases to collect more disaggregated data. The reclassifications resulted in some end-use categories that were no longer comparable with those in previous surveys. Where discontinuities occurred, estimates for the pre-1979 years have been made in the State Energy Data System (SEDS) to conform with the 1979 fuel oil deliveries classifications. The pre-1979 deliveries estimates are not published in this report, but are used in SEDS to disaggregate the known U.S. total product supplied (consumption) into State and major end-use sector consumption estimates.

   For distillate fuel oil deliveries in 1979, the end-use categories called "residential," "commercial," "industrial," and "farm" are available. The pre-1979 deliveries categories are called "heating" and "industrial" (which included farm use). While the pre-1979 categories individually are not continuous with the 1979 categories, their subtotals are related. That is, a general comparison can be made between the sum of residential, commercial, industrial, and farm deliveries in 1979 and the sum of heating and industrial deliveries in the pre-1979 years. Therefore, the following method was applied to present a comparable series for distillate fuel oil delivered to the residential, commercial, and industrial sectors:

   - For each of the pre-1979 years, a subtotal was created for each State by adding each State's heating and industrial deliveries categories. A comparable 1979 subtotal was created by adding each State's residential, commercial, industrial, and farm deliveries categories.

   - Residential, commercial, and industrial (including farm) shares of the subtotal in 1979 were calculated for each State.

   - These 1979 end-use shares were then applied to each pre-1979 subtotal of distillate fuel oil deliveries in each State to create State estimates of end-use deliveries for 1960 through 1978.

   The 1980 through 1982 distillate fuel oil deliveries data are based on the same survey as that used for 1979; therefore, the 1980 through 1982 data are directly comparable to 1979 data.

   In 1984, EIA again updated the list of respondents for this survey, and the Form EIA-172 became the Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report." EIA did not conduct a fuel oil and kerosene deliveries survey for 1983. The 1983 estimates in SEDS are based on 1984 data obtained from the Form EIA-821. Statistical procedures and methodologies used for the Form EIA-821 differ from those used in previous years. Therefore, the 1983 and forward sales data may not be directly comparable to the pre-1983 data. (In the source document, the deliveries data for 1983 forward are reported in thousand gallons. These data are first converted to thousand barrels before being entered into SEDS.)

   Some of the No. 2 diesel fuel reported as sold to the commercial and industrial sectors, DFCMPZZ and DFINPZZ, on the EIA forms may also be included in the on-highway data, DFONPZZ, obtained from the Federal Highway Administration. Included in the commercial sector is some diesel fuel consumed by government vehicles and school buses, and included in the industrial sector is some diesel fuel

consumed by fleets of trucks. Because the specific quantities involved are unknown, SEDS reflects the diesel fuel consumption as reported in the EIA *Petroleum Marketing Monthly* and no attempt has been made to adjust the end-use reporting.

4. The data on fuel oil consumed by the electric power sector for all years and States are actual fuel oil consumption numbers collected from electric power plants on Form EIA-923, "Power Plant Operations Report," and predecessor forms. Due to changes in fuel oil reporting classifications on the predecessor forms over the years, it is not possible to develop a thoroughly consistent series for all years. However, over time, data more accurately disaggregating fuel oil into distillate fuel oil and residual fuel oil have become available. For 1960 through 1969, only data on total fuel oil consumed at electric utilities by State are available. For 1970 through 1979, fuel oil consumed by plant type (internal combustion and gas turbine plants combined and steam plants) by State are available. For 1980 through 2000, data on consumption of light fuel oil at all plant types combined and consumption of heavy fuel oil at all plant types combined are available by State. For 2001 forward, data on consumption of distillate fuel oil and residual fuel oil are available. In SEDS, the following assumptions have been made:

   - 1960 through 1969 — State estimates of fuel oil consumption by plant type have been created for each year by applying the shares of steam plants (primarily residual fuel oil) and internal combustion and gas turbine plants (primarily distillate fuel oil plus small amounts of jet kerosene) by State in 1970 to each year's total fuel oil consumption at electric utilities for 1960 through 1969.

   - 1970 through 1979 — fuel oil consumed by steam plants is assumed to equal residual fuel oil consumption, and fuel oil consumed by internal combustion and gas turbine plants is assumed to equal distillate fuel oil plus jet kerosene consumption.

   - 1980 through 2000 — total heavy oil consumption at all plant types is assumed to equal residual fuel oil consumption, and total light oil consumption at all plant types is assumed to equal distillate fuel oil plus jet kerosene consumption.

   The data series thus derived for SEDS for residual fuel oil and distillate fuel oil consumption by the electric power sector is considered to be actual consumption by the electric power for each State and each year.

Data Sources for Distillate Fuel Oil

DFBKPZZ — Distillate fuel oil sales for vessel bunkering use by State, excluding that sold to the Armed Forces.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 and 1961: Table 17.
  - — 1962 and 1963: Table 16.
  - — 1964 and 1965: Table 15.
  - — 1966 through 1975: Table 11.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 11.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VVB_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VVB_Mgal_a.htm.

DFCMPZZ — Distillate fuel oil sales to the commercial sector for space heating, water heating, and cooking.

- 1960 through 1978: EIA estimates based on statistics of commercial sector deliveries of distillate fuel oil from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene in 1979," Table 1. State ratios based on 1979 commercial sector deliveries were applied to each State's sum of heating plus industrial (including farm use) deliveries

categories from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 3, on page 37.)
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.
- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VCS_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VCS_Mgal_a.htm.

DFIBPZZ — Distillate fuel oil sales to industrial establishments for space heating and for other industrial use, including farm use by State.

- 1960 through 1978: EIA estimates based on statistics of industrial sector deliveries of distillate fuel oil from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene in 1979," Table 1. State ratios based on 1979 industrial sector deliveries were applied to each State's sum of heating plus industrial (including farm use) deliveries categories from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 3, on page 37.)
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.
- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_vin_Mgal_a.htm and http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VFM_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_vin_Mgal_a.htm and http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VFM_ Mgal_a.htm.

DFMIPZZ — Distillate fuel oil sales to the Armed Forces for all uses by State.
- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - 1960 and 1961: Table 18.
  - 1962 and 1963: Table 17.
  - 1964 and 1965: Table 16.
  - 1966 through 1975: Table 12.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 12.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.
- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VMI_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VMI_Mgal_a.htm.

DFOCPZZ — Distillate fuel oil sales for use by oil companies by State.
- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - 1960 and 1961: Table 14.
  - 1962 and 1963: Table 13.
  - 1964 and 1965: Table 12.
  - 1966 through 1975: Table 9.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 9.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VOC_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/ dnav/pet/pet_cons_821dst_a_EPD0_VOC_Mgal_a.htm.

DFOFPZZ — Distillate fuel oil sales as diesel fuel for off-highway use by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 through 1962: Table 19.
  - — 1963 and 1964: Table 18.
  - — 1965 through 1967: Table 17.
  - — 1968 through 1975: Table 14.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 14.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD2D_VHF_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD2D_VHF_Mgal_a.htm.

DFONPZZ — Distillate fuel oil sales as diesel fuel for on-highway use by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 through 1962: Table 19.
  - — 1963 and 1964: Table 18.
  - — 1965 through 1967: Table 17.
  - — 1968 through 1975: Table 14.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 14.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD2D_VHN_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD2D_VHN_Mgal_a.htm.

DFOTPZZ — Distillate fuel oil sales for all other uses not identified in other sales categories.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 through 1962: Table 19.
  - — 1963 and 1964: Table 18.
  - — 1965 through 1967: Table 17.
  - — 1968 through 1975: Table 14.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 14.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly,* also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VOE_Mgal_a.htm.
- 1988 through 1994: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VOE_Mgal_a.htm.

- 1995 forward: Series discontinued; no data available. Values are assumed to be zero.

DFRRPZZ — Distillate fuel oil sales for use by railroads by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 and 1961: Table 16.
  - — 1962 and 1963: Table 15.
  - — 1964 and 1965: Table 14.
  - — 1966 through 1975: Table 10.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 10.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VRR_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VRR_Mgal_a.htm.

DFRSPZZ — Distillate fuel oil sales to the residential sector for space heating, water heating, and cooking.

- 1960 through 1978: EIA estimates based on statistics of residential sector deliveries of distillate fuel oil from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene in 1979," Table 1. State ratios based on 1979 residential sector deliveries were applied to each State's sum of heating plus industrial (including farm use) deliveries categories from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 3, on page 37.)
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 4.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A12.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VRS_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821dst_a_EPD0_VRS_Mgal_a.htm.

DFTCPUS — Distillate fuel oil total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - — 1981 through 2004: Table 2.
  - — 2005 forward: Table 1.

DKEIPZZ — Distillate fuel oil consumed by the electric power sector, including kerosene-type jet fuel.

- EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. The following assumptions have been made:
  - — 1960 through 1969: Only total fuel oil consumed at electric utilities by State is available. State estimates of distillate fuel oil consumption were created for each year by applying the shares of internal combustion and gas turbine plants (primarily distillate fuel oil plus small amounts of jet fuel) by State from 1970 to each year's total fuel oil consumption at electric utilities for 1960 through 1969.
  - — 1970 through 1979: Fuel oil consumed by plant type by State is available. Fuel oil consumed by internal combustion and gas turbine plants combined is assumed to equal distillate and jet fuel consumption.

— 1980 through 2000: Consumption of light fuel oil at all plant types by State is available. This is assumed to equal distillate and jet kerosene consumption.
— 2001 forward: Consumption of distillate fuel oil is available.

JKEUPZZ — Kerosene-type jet fuel consumed by the electric utility sector. (See data sources for JKEUPZZ under "Jet Fuel" on page 44.)

Jet Fuel

There are two types of jet fuel with different heat contents, kerosene-type jet fuel (JK) and naphtha-type jet fuel (JN), which are added in the State Energy Data System (SEDS) to give total jet fuel (JF). Jet fuel is used primarily for transportation, although small amounts of kerosene-type jet fuel are also used in the electric utility sector.

Kerosene-Type Jet Fuel

Physical Units

Data series used to calculate kerosene-type jet fuel consumption estimates are ("ZZ" in the variable name represents the two-letter State code that differs for each State):

JKTCPUS = kerosene-type jet fuel total consumed, in thousand barrels;
JKEUPZZ = the electric utility sector consumption of kerosene-type jet fuel in each State, in thousand barrels; and
JKTTPZZ = kerosene-type jet fuel total sold, in thousand gallons.

Total U.S. consumption of kerosene-type jet fuel, JKTCPUS, is the product supplied data series in the publication *Petroleum Supply Annual,* published by the U.S. Energy Information Administration (EIA).

Kerosene-type jet fuel consumed by electric utilities, JKEUPZZ, is published by EIA in the *Cost and Quality of Fuels for Electric Utility Plants*. These data are available for 1972 through 1982 only. Consumption from 1983 forward is assumed to be zero in SEDS. Beginning in 2001, jet fuel used for power generation is included in waste/other oil in the source data file. Data for waste/other oil are not processed in SEDS because waste oil is not primary energy. Consumption of the petroleum products that produced the waste oil has been accounted for elsewhere.

Kerosene-type jet fuel total sold, JKTTPZZ, was collected by the Ethyl Corporation, Petroleum Chemicals Division, for 1960 through 1983, and is collected by the EIA for 1984 forward. The Ethyl Corporation data are sales to commercial users and are used to represent total sales based on the assumption that there is little military use of kerosene-type jet fuel during 1960 through 1983. (See Note 1 in the "Additional Notes" section for the source reference for this assumption.) The EIA data for 1984 forward include commercial and military sales. Data for 1984 through 1993 are taken from the EIA *Petroleum Marketing Annual* (*PMA*). Data for 1994 forward are taken from unpublished data in thousand gallons and are available in thousand gallons per day in the EIA *PMA*. Prior to 1994, withheld data are estimated by using averages of published months to fill in withheld months; subtracting published States from published PAD District totals; and assigning values based on previous years' quantities. Beginning in 1994, withheld data are interpolated using growth rates for recent available years.

U.S. totals for the two State data series are calculated as the sum of the State data.

Most kerosene-type jet fuel is used by the transportation sector. The transportation sector consumption for the United States (JKACPUS) is estimated as the difference between the total kerosene-type jet fuel consumed and the electric utility consumption:

JKACPUS = JKTCPUS – JKEUPUS

It is assumed that kerosene-type jet fuel consumption in each State is in proportion to the amount sold in each State:

JKACPZZ = (JKTTPZZ / JKTTPUS) * JKACPUS

Total kerosene-type jet fuel by State is estimated as:

JKTCPZZ = JKACPZZ + JKEUPZZ

British Thermal Units (Btu)

Kerosene-type jet fuel has a heat content value of approximately 5.670 million Btu per barrel. This factor is applied to convert kerosene-type jet fuel from physical units to Btu:

JKACBZZ = JKACPZZ * 5.670
JKACBUS = ΣJKACBZZ
JKEUBZZ = JKEUPZZ * 5.670
JKEUBUS = ΣJKEUBZZ
JKTCBZZ = JKTCPZZ * 5.670
JKTCBUS = ΣJKTCBZZ

Additional Notes on Kerosene-Type Jet Fuel

1. An assumption is made that kerosene-type jet fuel use by the military in 1960 through 1983 is negligible. This assumption is based on product definitions from the American Petroleum Institute's *Standard Definitions for Petroleum Statistics*, Technical Report No. 1, Third Edition (1981), page 13, which states that kerosene-type jet fuel is used primarily by commercial aircraft engines.

2. Ethyl Corporation jet fuel sales to commercial users by State include some sales data that were improperly allocated between the States of Illinois and Indiana for 1960 through 1973. To adjust for this error, the average relative proportions of Illinois and Indiana sales from 1974 through 1978 were applied to the sum of the Illinois and Indiana sales in 1960 through 1973. From 1974 through 1983, sales data were correctly allocated.

3. Jet fuel sales in Illinois decreased sharply from 1984 forward, while sales in Indiana increased by about the same amount. It is possible that jet fuel for use at Chicago, Illinois, airports may have been purchased in Indiana. The same anomaly may have happened between New York and New Jersey beginning in 1981, when jet fuel for consumption at New York City airports may have been purchased in New Jersey. This is an inherent problem when using sales data as an indication of consumption, and no attempt has been made to adjust the numbers.

4. Prior to 1964, kerosene-type jet fuel was included in the total kerosene product supplied data in the source, the U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 2, "Salient Statistics of the Major Refined Petroleum Products in the United States." Table TN4 summarizes the derivation of kerosene and jet fuel consumption estimates (columns 4 and 5) from data published in the source (columns 1, 2, and 3) for 1960 through 1963. For 1964 and years following, kerosene and kerosene-type jet fuel are reported separately in the source documents.

5. Kerosene-type jet fuel consumed by electric utilities, JKEUPZZ, is published in the EIA *Cost and Quality of Fuels for Electric Utility Plants*. These data are available for 1972 through 1982 only. Consumption

Table TN4. Estimate of U.S. Consumption of Kerosene and Jet Fuel for 1960 through 1963
(Thousand barrels)

Year	(1) Kerosene Demand, Including Commercial Jet Fuel	(2) Jet Fuel Demand, Military Use Only	(3) Sales of Kerosene for Commercial Jet Fuel Use	(4) Estimated Kerosene Consumption (1) – (3)	(5) Estimated Total Jet Fuel Consumption (2) + (3)
1960	132,499	102,803	33,159	99,340	135,962
1961	144,435	104,436	47,187	97,248	151,623
1962	164,167	112,401	66,134	98,033	178,535
1963	172,212	115,237	75,236	96,976	190,473

in all other years is assumed to be zero. State-level data for 1972 through 1974 are not available. The percentage of each State's consumption of the total U.S. consumption in 1975 was used to apportion the 1972 through 1974 national data to the States.

Data Sources for Kerosene-type Jet Fuel

JKEUPZZ — Kerosene-type jet fuel consumed by electric utilities by State.

- 1960 through 1971: No data available. Values are assumed to be zero.
- 1972 through 1974: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Sales of Fuel Oil and Kerosene," Table 15 footnote for U.S. value. These data were apportioned to the States by using the 1975 State proportions of the 1975 U.S. total from the source below.
- 1975 through 1979: Office of Electric Power Regulation, Federal Energy Regulatory Commission, *Annual Summary of Cost and Quality of Electric Utility Plant Fuels*, "Fuel Oil Deliveries for Combustion Turbine and Internal Combustion Units."
- 1980 through 1982: EIA, *Cost and Quality of Fuel for Electric Utility Plants*, Table 30.
- 1983 forward: Data not available. Values are assumed to be zero in SEDS.

JKTTPZZ — Kerosene-type jet fuel total sold by State.

- 1960 through 1983: Ethyl Corporation, Petroleum Chemicals Division, *Yearly Report of Gasoline Sales by States*, "Aviation Turbine Fuel Sales."
- 1984 and 1985: EIA, *Petroleum Marketing Annual 1985*, Volume 2.
  - 1984: Table A6.
  - 1985: Table 34.
- 1986 through 1988: EIA, *Petroleum Marketing Annual*, Table 46.
- 1989 through 1993: EIA, *Petroleum Marketing Annual*, Table 48.
- 1994 forward: Unpublished data in thousand gallons from Form EIA-782C, "Monthly Report of Prime Supplier Sales of Petroleum Products Sold for Local Consumption." Data published in thousand gallons per day in EIA, *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/ pma_historical.html.
  - 1994 through 2006: Table 49.
  - 2007: Table 46.

JKTCPUS — Kerosene-type jet fuel total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

Naphtha-Type Jet Fuel

Physical Units

Two data series are used to estimate naphtha-type jet fuel consumption:

JNTCPUS = naphtha-type jet fuel total consumed, in thousand barrels; and
JNMIPZZ = naphtha-type jet fuel issued to the military in each State, in thousand barrels.

Total U.S. consumption of naphtha-type jet fuel, JNTCPUS, is the product supplied data series in the publication *Petroleum Supply Annual,* published by the EIA. Beginning in 2005, it is included in "Miscellaneous Petroleum Products," and is assigned a zero value in SEDS.

It is assumed that all naphtha-type jet fuel is used in military aircraft engines. (See the Additional Notes at the end of this section for the source reference for this assumption.) Data on naphtha-type jet fuel issued to the military in each State, JNMIPZZ, are from the U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center.

The total U.S. military issues is the sum of the State data:

JNMIPUS = ΣJNMIPZZ

An estimate of naphtha-type jet fuel consumption by State, JNTCPZZ, is calculated by assuming that each State consumes naphtha-type jet fuel in proportion to the amount issued to the military in that State:

JNTCPZZ = (JNMIPZZ / JNMIPUS) * JNTCPUS

All naphtha-type jet fuel is assumed to be used for transportation purposes so the transportation consumption equals the estimated total consumption for each State and for the United States:

JNACPZZ = JNTCPZZ
JNACPUS = JNTCPUS

British Thermal Units (Btu)

Naphtha-type jet fuel has a heat content value of approximately 5.355 million Btu per barrel. This factor is applied to convert naphtha-type jet fuel from physical units to Btu:

JNTCBZZ = JNTCPZZ * 5.355
JNTCBUS = ΣJNTCBZZ
JNACBZZ = JNTCBZZ
JNACBUS = JNTCBUS

Additional Notes on Naphtha-Type Jet Fuel

1. An assumption is made that the naphtha-type jet fuel is for military use only. This assumption is based on product definitions from the American Petroleum Institute's *Standard Definitions for Petroleum Statistics*, Technical Report No. 1, Third Edition (1981), page 13, which states that naphtha-type jet fuel is used primarily by military aircraft engines.

2. Data on naphtha-type jet fuel issued to the military for each State (JNMIPZZ) are obtained from the U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center. There are no data available for 1960 through 1974, and the data available for 1975 and 1976 are not consistent; therefore, the 1977 values are used for 1960 through 1976 in SEDS. The data are reported by fiscal year for 1977 through 1988 and are taken from the Defense Energy Information System. For 1989 and 1990, fiscal-year data from two databases, Defense Fuel Automated Management System and the Into-Plane Database, are summed. For 1991 and 1992, data from the same two databases, reported by calendar year, are used.

3. Since total naphtha-type jet fuel product supplied is assumed to be zero beginning in 2005, naphtha-type jet fuel issued to the military is also assumed to be zero for 2005 forward.

Data Sources for Naphtha-type Jet Fuel

JNMIPZZ — Naphtha-type jet fuel issued to the military in the United States.

- 1960 through 1974: No data are available. The 1977 data are used for each year.
- 1975 and 1976: No consistent data series are available. The 1977 data are used for both years.
- 1977 through 1987: The U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center, Defense Energy Information System, military retail issues based on fiscal year data. The District of Columbia issues are assumed to be zero; therefore, values reported for the District of Columbia are added to Maryland.
- 1988: U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center, average of 1987 data (see source above) and 1989 data (see source below).
- 1989 and 1990: U.S. Department of Defense, Defense Logistics Agency, Defense Fuel Supply Center, Defense Fuel Automated Management System, military wholesale issues based on fiscal year data.
- 1991 through 2004: U.S. Department of Defense, Defense Logistics Agency, Defense Energy Supply Center. State data for the calendar year from two databases are summed: Defense Fuel Automated Management System (military wholesale issues) and Into-Plane Database (military purchases from commercial airports). Into-plane values reported for the District of Columbia are added to Virginia.
- 2005 forward: Value entered in SEDS as zero.

JNTCPUS — Naphtha-type jet fuel total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Data not reported separately. Volumes are included in "Miscellaneous Petroleum Products" in the *Petroleum Supply Annual*, Table 1. Value entered in SEDS as zero.

Jet Fuel Totals

Physical Unit

The following calculations are used to provide total jet fuel consumption estimates by end use in physical units:

JFACPZZ = JKACPZZ + JNACPZZ
JFACPUS = ΣJFACPZZ
JFEUPZZ = JKEUPZZ
JFEUPUS = JKEUPUS
JFTCPZZ = JFACPZZ + JFEUPZZ
JFTCPUS = ΣJFTCPZZ

British Thermal Units (Btu)

The following calculations are used to provide total jet fuel consumption estimates by end use in Btu:

JFACBZZ = JKACBZZ + JNACBZZ
JFACBUS = ΣJFACBZZ
JFEUBZZ = JKEUBZZ
JFEUBUS = JKEUBUS
JFTCBZZ = JFACBZZ + JFEUBZZ
JFTCBUS = ΣJFTCBZZ

Kerosene

Physical Units

Because State-level and end-use consumption data for kerosene are not available, four data series published by U.S. Energy Information Administration (EIA) representing sales of kerosene into or within each State are used to estimate kerosene consumption. The fifth data series, the U.S. total consumption, is the product supplied series from the EIA *Petroleum Supply Annual*. The sales series are used to apportion the known U.S. total consumption into State-level estimates of end-use consumption. The following variable names have been assigned to the five data series ("ZZ" in the variable names represents the two-letter State code that differs for each State):

KSCMPZZ = kerosene sold to the commercial sector for heating, in thousand barrels;
KSIHPZZ = kerosene sold to the industrial sector for heating, in thousand barrels;
KSOTPZZ = kerosene sold for all other uses, including farm use, in thousand barrels;
KSRSPZZ = kerosene sold to the residential sector for heating, in thousand barrels; and
KSTCPUS = kerosene total consumed in the United States, in thousand barrels.

U.S. sales totals for each of the four State-level series are created by summing the State values.

The variables are combined as closely as possible into the major end-use sectors used in SEDS. The residential and commercial sectors contain only KSRSPZZ and KSCMPZZ, respectively.

The sales of kerosene to the industrial sector, KSINPZZ, for each State is the sum of kerosene sold for industrial space heating (KSIHPZZ) and kerosene sold for all other uses (KSOTPZZ), including farm use. Sales of kerosene to the industrial sector are calculated:

KSINPZZ = KSOTPZZ + KSIHPZZ
KSINPUS = ΣKSINPZZ

Total sales of kerosene in each State is the sum of these three sectors' sales:

KSTTPZZ = KSRSPZZ + KSCMPZZ + KSINPZZ
KSTTPUS = ΣKSTTPZZ

An estimate of each State's total consumption of kerosene is made by disaggregating the U.S. total consumption to the States in proportion to each State's sales share of the U.S. total sales:

KSTCPZZ = (KSTTPZZ / KSTTPUS) * KSTCPUS

Each State's residential sector sales percentage of total sales is applied to the State's estimated total consumption to create estimated residential sector consumption for the State, KSRCPZZ:

KSRCPZZ = (KSRSPZZ / KSTTPZZ) * KSTCPZZ

The commercial sector's estimated consumption in each State, KSCCPZZ, is calculated:

KSCCPZZ = (KSCMPZZ / KSTTPZZ) * KSTCPZZ

The industrial sector's estimated consumption in each State, KSICPZZ, is calculated:

KSICPZZ = (KSINPZZ / KSTTPZZ) * KSTCPZZ

U.S. totals for the three sectors' consumption estimates are the sums of the States' estimated consumption.

Data on kerosene consumed by the electric power sector are not available before 2003. Beginning in 2003, kerosene used for power generation is included in waste/other oil in the source data file. Data for waste/other oil are not processed in SEDS because waste oil is not primary energy. Consumption of the petroleum products that produced the waste oil has been accounted for elsewhere.

British Thermal Units (Btu)

Kerosene has a heat content value of approximately 5.670 million Btu per barrel. This factor is applied to convert kerosene estimated consumption from physical units to Btu:

KSRCBZZ = KSRCPZZ * 5.670
KSCCBZZ = KSCCPZZ * 5.670
KSICBZZ = KSICPZZ * 5.670

Total estimated consumption of kerosene in Btu is the sum of the end-use consumption estimates.

KSTCBZZ = KSRCBZZ + KSCCBZZ + KSICBZZ

The U.S. Btu consumption estimates for the three consuming sectors and the U.S. total are calculated as the sum of the State-level data.

Additional Notes on Kerosene

1. See Note 4 at the end of the "Kerosene-Type Jet Fuel" section on page 43 for comments concerning the inclusion of kerosene-type jet fuel with the kerosene total product supplied prior to 1964 in the source documents.

2. "Sales" data are actually called "shipments" in the source documents for 1960 and 1961; "consumption" for 1962 through 1966; "shipments" for 1967; "sales" from 1968 through 1978; "deliveries" for 1979 through 1983; and "sales" for 1984 forward.

3. In 1979, the U.S. Energy Information Administration (EIA) implemented a new survey form, EIA-172, to obtain deliveries of fuel oil and kerosene data and updated the list of respondents. (A detailed explanation is published in the *Energy Data Report* "Deliveries of Fuel Oil and Kerosene in 1979.") In this survey form, certain end-use categories were redefined—in many cases, to collect more disaggregated data. The reclassifications resulted in some end-use categories that were no longer comparable with those in previous surveys. Where discontinuities occurred, estimates for the pre-1979 years have been made in SEDS to conform with the 1979 kerosene deliveries classifications. The pre-1979 deliveries estimates are not published in this

report but are used in SEDS to disaggregate the known U.S. total product supplied (consumption) into State and major end-use sector consumption estimates.

For kerosene deliveries in 1979, the end-use categories called "residential," "commercial," and "industrial" are available. The pre-1979 deliveries category called "heating" is related to the sum of "residential," "commercial," and "industrial" in 1979. Therefore, the following method was applied to present a comparable series for kerosene delivered to the residential, commercial, and industrial sectors:

- A 1979 subtotal for heating was created by summing each State's residential, commercial, and industrial deliveries categories, thereby creating a comparable deliveries subtotal for all years.
- Residential, commercial, and industrial shares of the heating subtotal in 1979 were calculated for each State.
- These 1979 end-use shares were then applied to each pre-1979 heating subtotal in each State to create State estimates of end-use deliveries for 1960 through 1978.

The 1980 through 1982 kerosene deliveries data are based on the same survey as that used for 1979; therefore, the 1980 through 1982 data are directly comparable to 1979 data.

4. In 1984, EIA again updated the list of respondents for this survey, and the Form EIA-172 became the Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report." EIA did not conduct a fuel oil and kerosene sales survey for 1983. The 1983 estimates in SEDS are based on 1984 data obtained from the Form EIA-821. Statistical procedures and methodologies used for the Form EIA-821 differ from those used in previous years and are described in the July 1985 issue of the EIA, *Petroleum Marketing Monthly*. Therefore, the 1983 and forward sales data may not be directly comparable to the pre-1983 data. (In the source document, the sales data for 1983 forward are reported in thousand gallons. These data were first converted to thousand barrels before being entered into SEDS.)

5. In 1975 through 1977, the industrial sector consumption of kerosene includes small quantities of kerosene-type jet fuel that were produced as jet fuel and sold as kerosene.

Data Sources for Kerosene

KSCMPZZ — Kerosene sold to the commercial sector for heating.

- 1960 through 1978: EIA estimates based on statistics of commercial sector deliveries of kerosene from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene, in 1979," Table 3. State ratios based on 1979 commercial sector deliveries were applied to each State's heating deliveries category from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 3, on page 47.)
- 1979 and 1980: EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene," Table 3.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 6.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983 through 1987: EIA, *Petroleum Marketing Monthly*. The specific tables are:
  - 1983: July 1985 issue, Table A14.
  - 1984: July 1986 issue, Table A4, subsequently revised in the EIA, Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VCS_Mgal_a.htm.
  - 1985 and 1986: July 1987 issue, Table A6.
  - 1987: June 1988 issue, Table A6.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VCS_Mgal_a.htm, select Excel file labeled "Download Series History."

KSIHPZZ — Kerosene sold to the industrial sector for heating.

- 1960 through 1978: EIA estimates based on statistics of industrial sector deliveries of kerosene from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene in 1979," Table 3. State ratios based on 1979 industrial sector deliveries were applied to each State's heating deliveries category from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 3, on page 47.)

- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 3.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 6.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983 through 1987: EIA, *Petroleum Marketing Monthly*. The specific tables are:
  - 1983: July 1985 issue, Table A14.
  - 1984: July 1986 issue, Table A4, subsequently revised in the EIA, Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_vin_Mgal_a.htm.
  - 1985 and 1986: July 1987 issue, Table A6.
  - 1987: June 1988 issue, Table A6.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_vin_Mgal_a.htm, select Excel file labeled "Download Series History."

KSOTPZZ — Kerosene sold for all other uses, including farm use.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - 1960 and 1961: Table 10.
  - 1962 and 1963: Table 9.
  - 1964 and 1965: Table 8.
  - 1966 through 1975: Table 5.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 5.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene." Calculated as the sum of kerosene delivered for farm and other use from Table 3.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 6.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983 through 1987: EIA, *Petroleum Marketing Monthly*. The specific tables are:
  - 1983: July 1985 issue, Table A14.
  - 1984: July 1986 issue, Table A4, subsequently revised in the EIA, Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VOE_Mgal_a.htm and http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VFM_Mgal_a.htm.
  - 1985 and 1986: July 1987 issue, Table A6.
  - 1987: June 1988 issue, Table A6.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VOE_Mgal_a.htm and http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VFM_Mgal_a.htm, select Excel file labeled "Download Series History."

KSRSPZZ — Kerosene sold to the residential sector for heating.

- 1960 through 1978: EIA, *Energy Data Report* "Deliveries of Fuel Oil and Kerosene in 1979," Table 3. State ratios based on 1979 residential sector deliveries were applied to each State's heating deliveries category from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 3, on page 47.)
- 1979 and 1980: EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene," Table 3.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 6.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983 through 1987: EIA, *Petroleum Marketing Monthly*. The specific tables are:
  - 1983: July 1985 issue, Table A14.
  - 1984: July 1986 issue, Table A4, subsequently revised in the EIA, Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VRS_Mgal_a.htm.
  - 1985 and 1986: July 1987 issue, Table A6.
  - 1987: June 1988 issue, Table A6.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, http://www.eia.gov/dnav/pet/pet_cons_821ker_a_EPPK_VRS_Mgal_a.htm, select Excel file labeled "Download Series History."

KSTCPUS — Kerosene total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*. "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.

- 1988 forward: EIA, *Petroleum Supply Annual,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1988 through 2004: Table 2.
  - 2005 forward: Table 1.

Liquefied Petroleum Gases

Liquefied petroleum gases (LPG) in the State Energy Data System (SEDS) include: ethane (including ethylene), propane (including propylene), normal butane (including butylene), butane-propane mixtures, ethane-propane mixtures, and isobutane.

Physical Units

The following data series used in SEDS to estimate LPG consumption represent sales or estimated sales by State in thousand gallons.

LGCBMZZ = LPG sold for internal combustion engine fuel use. Included are sales for use in all kinds of highway vehicles, forklifts, industrial tractors, and for use in oil field drilling and production;

LGHCMZZ = LPG sold for residential and commercial use. Included are sales for nonfarm private households for space heating, cooking, water heating, and other household uses, such as clothes drying and incineration. Also included are sales to nonmanufacturing organizations, such as motels, restaurants, retail stores, laundries, and other service enterprises, primarily for use in space heating, water heating, and cooking; and

LGTTPZZ = LPG total sales for all uses.

Beginning in 2008, these series were discontinued in American Petroleum Institute's (API) *Sales of Natural Gas Liquids and Liquefied Refinery Gases*. Only propane sales data are available at the State level. A new methodology has been developed to estimate State-level propane consumption and all other LPG consumption in 2008. For propane consumption, API's State shares of propane sales are applied to the U.S. product supplied published in U.S. Energy Information Administration's (EIA) *Petroleum Supply Annual* (*PSA*). For all other LPG, State shares derived from the 2007 API report are used to allocate U.S. product supplied of LPG other than propane from *PSA* to the States. The adjusted propane sales for the residential and consumption sectors and for internal combustion engine fuel use are assigned to LGHCMZZ and LGCBMZZ respectively, and the sum of the adjusted propane sales and all other LPG sales are assigned to LGTTPZZ.

The U.S. totals for each of these State-level data series are calculated as the sum of the State values.

Total U.S. consumption of LPG is the product supplied data series in EIA *Petroleum Supply Annual:*

LGTCPUS = LPG total consumed in the United States, in thousand barrels.

Another variable is used in SEDS to estimate LPG consumption by the transportation sector:

LGTRSUS = the transportation sector share of LPG internal combustion engine sales.

Its computation is described in detail in Note 2 on page 52.

Similarly, variables are used in SEDS to estimate LPG consumption by the residential and commercial sectors:

LGRCSZZ = the residential sector share of LPG residential and commercial sales.

LGCCSZZ = the commercial sector share of LPG residential and commercial sales.

Their computation is described in detail in Note 3 on page 52.

Since the LPG sales data are in gallons, they must be converted to barrels (42 U.S. gallons per U.S. barrel) to be comparable to total consumption estimates. The formulas for calculating State sales data are:

LGCBPZZ = LGCBMZZ / 42

LGCBPUS = ΣLGCBPZZ
LGHCPZZ = LGHCMZZ / 42
LGHCPUS = ΣLGHCPZZ

It is also assumed that LPG sales to the residential and commercial sectors are equal to the consumption in those sectors. LPG consumption by the residential sector is estimated to be the residential share of propane sales for the residential and commerical sectors:

LGRCPZZ = LGHCPZZ * LGRCSZZ

LPG consumption by the commercial sector is estimated to be the commercial share of propane sales for the residential and commerical sectors:

LGCCPZZ = LGHCPZZ * LGCCSZZ

LPG consumption by the transportation sector is estimated to be the transportation share of the sales for internal combustion engine fuel:

LGACPZZ = LGCBPZZ * LGTRSUS

An estimate of each State's total LPG consumption (LGTCPZZ) is made by allocating the U.S. total consumption to the States in proportion to each State's share of the U.S. total sales:

LGTCPZZ = (LGTTPZZ / LGTTPUS) * LGTCPUS

Industrial sector consumption (LGICPZZ) for each State is the difference between the State's total LPG consumption and the sum of its residential, commercial, and transportation sectors' consumption:

LGICPZZ = LGTCPZZ – (LGRCPZZ + LGCCPZZ + LGACPZZ)

U.S. totals for the four end-use sector consumption estimates are calculated as the sums of the State estimates.

British Thermal Units (Btu)

The factor for converting LPG from physical unit values to Btu, LGTCKUS, is calculated annually for 1967 forward by EIA as a consumption-weighted average of the heat contents of the component products (ethane, propane, butane, butane-propane, ethane-propane, and isobutane) as shown in Appendix B. LGTCKUS is shown in Table B1 on page 151 and the individual product heat contents are listed beginning on page 164. For 1960 through 1966, EIA adopted the Bureau of Mines thermal conversion factor of 4.011 million Btu per barrel.

This factor is used to estimate consumption in Btu for all States and end uses:

LGRCBZZ = LGRCPZZ * LGTCKUS
LGCCBZZ = LGCCPZZ * LGTCKUS
LGICBZZ = LGICPZZ * LGTCKUS
LGACBZZ = LGACPZZ * LGTCKUS

Total estimated consumption of LPG in Btu is the sum of the end-use consumption estimates:

LGTCBZZ = LGRCBZZ + LGCCBZZ + LGICBZZ + LGACBZZ

The U.S. Btu consumption estimates for the four sectors and total LGP are calculated as the sum of the State data.

Additional Notes on Liquefied Petroleum Gases

1. Sales data for Maryland and the District of Columbia (D.C.) are combined in the source documents. Sales data are published in six categories through 2007. The percentages shown in Table TN5 are applied to disaggregate the State data in each of the sectors for these

Table TN5. Percentages Used to Disaggregate Maryland and D.C. Combined LPG Sales Data

Sales Category	Maryland	D.C.
Residential and commercial	99.9%	0.1%
Internal combustion engine fuel	98.9	1.1
Industrial	99.4	0.6
Chemical	100.0	0.0
Utility gas	100.0	0.0
Miscellaneous	100.0	0.0

years. In 2008, the same percentages for the residential and commercial, and internal combustion engine fuel shown in Table TN5 are applied to the combined Maryland and D.C. sales for those sales categories. The percentages for the remaining categories are combined using the 2007 data for those categories, resulting in 99.79 percent for Maryland and 0.21 percent for D.C. These percentages are applied to the remaining volumes of the combined Maryland and D.C. sales.

2. Sales of LPG for internal combustion engine fuel use are divided between the transportation sector and the industrial sector by using LGTRSUS, the transportation sector's share of internal combustion engine use. LGTRSUS is estimated from data on "special fuels used on highways," a category that includes only LPG and diesel fuel. The special fuels data are published by the U.S. Department of Transportation, Federal Highway Administration (see MGSFPZZ on page 60). The quantity of LPG included in special fuels is estimated each year (the LPG portion ranges from 8.4 percent in 1960 to 0.6 percent in 2007). LGTRSUS is then derived by dividing the quantity of LPG included in special fuels used on highways by the quantity of LPG sold for internal combustion engine use. This U.S. factor is applied to the internal combustion engine use of each State. LGTRSUS values are shown in Table TN6.

3. The shares of propane used by the residential (LGRCS) and commercial (LGCCS) sectors for each State are based on propane sales data in the API report for 2003 forward. The average shares of 2003 through 2008 are applied to the earlier years. Data for LPG sold for residential and commercial use are then split into the two end-use sectors using these two variables.

4. LPG sales data by State and end-use categories for 1960 through 1982 are from EIA's "Sales of Liquefied Petroleum Gases and Ethane." In 1979, EIA modified the LPG sales survey, Form EIA-174, and changed the list of respondents. Because of the updated sampling frame, the 1979 through 1982 sales data may not be directly comparable to the pre-1979 sales when a different estimation procedure was used. Explanation of the discontinuities caused by the change in the 1979 sampling frame are provided in EIA's *Energy Data Report,* "Sales of Liquefied Petroleum Gases and Ethane in 1979."

Because of the change in survey techniques used for measuring LPG sales, many States' data were withheld from publication in the 1979 through 1982 LPG sales reports to avoid disclosure of company-level data. The consumption estimates in SEDS use all data published in the 1979 through 1982 LPG sales reports and estimates prepared by EIA's Office of Oil and Gas for data that were withheld from publication. (See Note 5 following for estimation procedures.)

Some end-use categories changed in 1979 due to redefinition of the classifications. One of these changes, for example, occurred with LPG sold to farms for household heating and cooking. Prior to 1979 these sales were reported as part of the residential and commercial category, while in 1979 they were counted in the farm use category that goes into the industrial sector in SEDS. No attempt has been made to adjust for this type of inconsistency.

The Form EIA-174 was cancelled after collection of 1982 data. The 1983 LPG consumption estimates are based on the assumption that LPG end-use sector demand in 1983 occurred in the same proportion

Table TN6. Transportation Sector Share of LPG Internal Combustion Engine Use, 1960 Forward

Year	LGTRSUS	Year	LGTRSUS	Year	LGTRSUS
1960	0.229	1977	0.478	1994	0.734
1961	0.258	1978	0.594	1995	0.416
1962	0.266	1979	0.536	1996	0.337
1963	0.273	1980	0.380	1997	0.278
1964	0.259	1981	0.671	1998	0.592
1965	0.290	1982	0.579	1999	0.364
1966	0.325	1983	0.578	2000	0.215
1967	0.368	1984	0.631	2001	0.204
1968	0.389	1985	0.440	2002	0.325
1969	0.341	1986	0.456	2003	0.373
1970	0.363	1987	0.375	2004	0.365
1971	0.423	1988	0.437	2005	0.513
1972	0.392	1989	0.428	2006	0.496
1973	0.384	1990	0.471	2007	0.370
1974	0.381	1991	0.426	2008	0.781
1975	0.406	1992	0.425		

as 1982 sector demand within each State; i.e., the 1983 LPG product supplied figure was allocated to the States by using the distribution of volumes consumed for 1982.

5. The following procedures were used to estimate the State end-use sales that were withheld from publication in the 1979-1982 LPG sales reports:

   - For each year, missing State total sales were estimated by allocating the sum of the missing State sales within each Petroleum Administration for Defense (PAD) District to the individual States, in proportion to the sum of the known end-use sales for those States.

   - Missing PAD District end-use totals for 1979 and 1980 were obtained by using the 1980 and 1981 sales reports. Missing PAD District chemical sales were estimated by allocating the total missing volume of chemical sales to the PAD District in proportion to the number of chemical plants in each PAD District. The remaining PAD District end-use totals were obtained by subtraction. For 1981 and 1982, no PAD District estimations were necessary because all PAD District end-use totals are known.

   - The published data and the estimated State and PAD District end-use totals were used to estimate missing State end-use sales volumes within a PAD District: missing State end-use sector values were estimated by allocating the missing volume for the State approximately proportional to the PAD District end-use sector totals.

6. Prior to 1979, State data for chemical use of LPG were withheld from publication, although they were included in the U.S. total in the tables in EIA's "Sales of Liquefied Petroleum Gases and Ethane" reports. Beginning in 1979, State-level chemical use data were published in the LPG sales reports, but data for several States were withheld. Estimates for the withheld data for chemical use sales for 1979 and 1980 were created by using the estimation procedure described in Note 5 above. Then the published and the estimated State data for 1979 were used to create State shares of the total U.S. chemical use sales. These percentage shares (shown in Table TN7) were applied to the total U.S. LPG chemical use sales in 1960 through 1978 to create State chemical use estimates. The chemical use estimates were added to the States' total LPG sales series, LGTTPZZ.

Table TN7. State Shares of the Total U.S. LPG Sold for Chemical Use, 1960 Through 1978

State	Percent	State	Percent
Alabama	0.000	Montana	0.000
Alaska	0.589	Nebraska	0.000
Arizona	0.000	Nevada	0.000
Arkansas	0.000	New Hampshire	0.000
California	2.667	New Jersey	2.040
Colorado	0.232	New Mexico	0.603
Connecticut	0.053	New York	0.000
Delaware	0.811	North Carolina	0.327
District of Columbia	0.000	North Dakota	0.000
Florida	0.000	Ohio	1.103
Georgia	0.699	Oklahoma	0.309
Hawaii	0.000	Oregon	0.000
Idaho	0.000	Pennsylvania	0.354
Illinois	7.066	Rhode Island	0.000
Indiana	0.243	South Carolina	0.021
Iowa	0.900	South Dakota	0.000
Kansas	0.451	Tennessee	0.000
Kentucky	2.548	Texas	57.425
Louisiana	20.566	Utah	0.000
Maine	0.012	Vermont	0.000
Maryland	0.050	Virginia	0.025
Massachusetts	0.009	Washington	0.000
Michigan	0.151	West Virginia	0.286
Minnesota	0.000	Wisconsin	0.000
Mississippi	0.315	Wyoming	0.091
Missouri	0.054	United States	100.000

7. For 1984 through 2007, the American Petroleum Institute (API), the Gas Processors Association, and the National LP-Gas Association jointly sponsored an LPG sales survey. The results are published in the API's report *Sales of Natural Gas Liquids and Liquefied Refinery*

Gases. These data include sales of pentanes plus; the pentanes plus data were removed by EIA prior to use in SEDS.

Beginning in 1997, API incorporated additional imports and exports data in their estimates. Those trade data are also removed by EIA prior to use in SEDS.

Data Sources for Liquefied Petroleum Gases

LGCBMZZ — LPG sold for internal combustion engine use by State.

Note: Data for Maryland and the District of Columbia are combined for all years. The method for disaggregating the data is explained in Note 1, on page 52.

- 1960 through 1967: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Liquefied Petroleum Gases and Ethane." The specific tables are:
  - — 1960 and 1961: Table 5 (data called "Shipments").
  - — 1962 through 1966: Table 2 (data called "Consumption").
  - — 1967: Table 2 (data called "Shipments").
- 1968 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Sales of Liquefied Petroleum Gases and Ethane," Table 2.
- 1976 through 1980: EIA, *Energy Data Reports*, "Sales of Liquefied Petroleum Gases and Ethane," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, "Sales of Liquefied Petroleum Gases and Ethane," Table 3.
- 1983: EIA estimates.

Note: For 1984 forward, some data are adjusted and estimated by EIA. (See explanation in Note 7, on page 53.)

- 1984 through 1988: American Petroleum Institute, *1990 Sales of Natural Gas Liquids and Liquefied Refinery Gases*, pages 24 through 33.
- 1989 through 1991: American Petroleum Institute, *1992 Sales of Natural Gas Liquids and Liquefied Refinery Gases*, pages 4, 5, 18, and 19.
- 1992 through 2007: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table 3.
- 2008: EIA estimates based on propane sold for internal combustion engine use by State, published by the American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table B.

LGCCSZZ — Commercial sector share of residential and commercial sales of LPG.

- 1960 through 2002: EIA estimates based on the residential and commerical shares of propane used by the residential and commercial sectors published by the American Petroleum Institute.
- 2003 through 2007: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table 3.
- 2008: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table B.

LGHCMZZ — LPG sold for residential and commercial use by State.

Note: Data for Maryland and the District of Columbia are combined for all years. The method for disaggregating the data is explained in Note 1, on page 51.

- 1960 through 1967: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Liquefied Petroleum Gases and Ethane." The specific tables are:
  - — 1960 and 1961: Table 5 (data called "Shipments").
  - — 1962 through 1966: Table 2 (data called "Consumption").
  - — 1967: Table 2 (data called "Shipments").
- 1968 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Sales of Liquefied Petroleum Gases and Ethane," Table 2.
- 1976 through 1980: EIA, *Energy Data Reports*, "Sales of Liquefied Petroleum Gases and Ethane," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, "Sales of Liquefied Petroleum Gases and Ethane," Table 3.
- 1983: EIA estimates.

Note: For 1984 forward, some data are adjusted and estimated by EIA. (See explanation in Note 7, on page 53.)

- 1984 through 1988: American Petroleum Institute, *1990 Sales of Natural Gas Liquids and Liquefied Refinery Gases*, pages 24 through 33.
- 1989 through 1991: American Petroleum Institute, *1992 Sales of Natural Gas Liquids and Liquefied Refinery Gases*, pages 4, 5, 18, and 19.
- 1992 through 2007: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table 3.
- 2008: EIA estimates based on propane sold for residential and commercial use by State, published by the American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table B.

LGRCSZZ — Residential sector share of residential and commercial sales of LPG.

- 1960 through 2002: EIA estimates based on the residential and commerical shares of propane used by the residential and commercial sectors published by the American Petroleum Institute.
- 2003 through 2007: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table 3.
- 2008: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table B.

LGTCKUS — Factor for converting LPG from physical units to Btu.

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Crude Petroleum and Petroleum Products, 1956," Table 4 footnote, constant value of 4.011 million Btu per barrel.
- 1967 forward: Calculated annually by EIA as a weighted average by multiplying the quantity consumed of each of the component products by each product's conversion factor and dividing the sum of those heat contents by the sum of the quantities consumed. The component products are ethane (including ethylene), propane (including propylene), normal butane (including butylene), butane-propane mixtures, ethane-propane mixtures, and isobutane. Their heat content conversion factors are listed in Appendix B beginning on page 164. Quantities consumed are from:
  - 1967 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
  - 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
    - 1981 through 2004: Table 2.
    - 2005 forward: Table 1.

LGTCPUS — LPG total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*. "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

LGTRSUS — The transportation sector share of LPG internal combustion engine sales.

- EIA estimates based on the LPG portion of the special fuels used on highways published by the U.S. Department of Transportation, Federal Highway Administration (variable MGSFPUS in SEDS), as a percentage of the LPG sold for internal combustion engine use published by the American Petroleum Institute (variable LGCBMUS in SEDS). For an explanation of the estimation method, see Note 2, on page 52.

LGTTPZZ — LPG total sales for all uses by State.

Note: Data for Maryland and the District of Columbia are combined for all years. The method for disaggregating the data is explained in Note 1, on page 52.

- 1960 through 1967: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Liquefied Petroleum Gases and Ethane." The specific tables are:
  - 1960 and 1961: Table 5 (data called "Shipments").
  - 1962 through 1966: Table 2 (data called "Consumption").
  - 1967: Table 2 (data called "Shipments").
- 1968 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Sales of Liquefied Petroleum Gases and Ethane," Table 2.
- 1976 through 1980: EIA, *Energy Data Reports*, "Sales of Liquefied Petroleum Gases and Ethane," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, "Sales of Liquefied Petroleum Gases and Ethane," Table 3.
- 1983: EIA estimates.

Note: For 1984 forward, some data are adjusted and estimated by EIA. (See explanation in Note 7, on page 53.)

- 1984 through 1988: American Petroleum Institute, *1990 Sales of Natural Gas Liquids and Liquefied Refinery Gases*, pages 24 through 33.
- 1989 through 1991: American Petroleum Institute, *1992 Sales of Natural Gas Liquids and Liquefied Refinery Gases*, pages 4, 5, 18, and 19.
- 1992 through 2007: American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases,* Table 3.

- 2008: EIA estimates based on total propane sold by State, published by the American Petroleum Institute, *Sales of Natural Gas Liquids and Liquefied Refinery Gases*, Table B.

Lubricants

Physical Units

Three data series are used to estimate State consumption of lubricants. The two State-level sales data series are used to apportion the U.S. total consumption data to the States and the end-use sectors within the States. "ZZ" in the variable names represents the two-letter State code that differs for each State:

LUINPZZ = lubricants sold to the industrial sector, in thousand barrels;
LUTRPZZ = lubricants sold to the transportation sector, in thousand barrels; and
LUTCPUS = lubricants total consumed in the United States, in thousand barrels.

Data for the first two variables are developed from the Bureau of the Census reports "Sales of Lubricating and Industrial Oils and Greases" in the *Current Industrial Reports* series. These series were discontinued in 1977 and the method of estimation for 1978 forward is explained in Note 1 at the end of this "Lubricants" section. The third variable for lubricants is the product supplied data series in the U.S. Energy Information Administration's (EIA) *Petroleum Supply Annual.* The first two variables are used for apportioning the third into State total consumption and State end-use consumption estimates.

Total sales of lubricants for each State, LUTTPZZ, is created by adding the industrial and transportation sales:

LUTTPZZ = LUINPZZ + LUTRPZZ

U.S. sales totals are calculated by summing the State sales data.

Each State's proportion of total U.S. sales is used to calculate each State's estimated consumption of lubricants:

LUTCPZZ = (LUTTPZZ / LUTTPUS) * LUTCPUS

Each State's estimated total consumption of lubricants is further divided into end-use estimates in proportion to that State's sales by sector as a portion of total sales in the State. Lubricants consumed by State for industrial use, LUICPZZ, and for transportation use, LUACPZZ, are calculated:

LUICPZZ = (LUINPZZ / LUTTPZZ) * LUTCPZZ
LUACPZZ = (LUTRPZZ / LUTTPZZ) * LUTCPZZ

The consumption of lubricants in the United States by these two end-use sectors is created by summing the State estimates.

British Thermal Units (Btu)

Lubricants have a heat content value of approximately 6.065 million Btu per barrel. This factor is applied to convert lubricants estimated consumption from physical units to Btu:

LUICBZZ = LUICPZZ * 6.065
LUACBZZ = LUACPZZ * 6.065

The State total consumption in Btu is the sum of the two sectors' consumption in Btu:

LUTCBZZ = LUICBZZ + LUACBZZ

The U.S. sector and total consumption estimates in Btu are calculated as the sum of the State data.

Additional Notes on Lubricants

1. The lubricants sales data (LUINPZZ and LUTRPZZ) were published approximately every other year by the Bureau of the Census until the discontinuation of the series after 1977. Each year's sales data have been used to calculate that year's and at least one other year's consumption estimates. Table TN8 specifies which years of consumption estimates depend on which years of the sales data.

Table TN8. Lubricants Sales Data Used in Consumption Estimates

Year of Sales Data	Year of Consumption Estimates
1960	1960 and 1961
1962	1962, 1963, and 1964
1965	1965 and 1966
1967	1967 and 1968
1969	1969 and 1970
1971	1971 and 1972
1973	1973 and 1974
1975	1975 and 1976
1977	1977 forward

2. The sales data from the source document for LUINPZZ and LUTRPZZ are available in incompatible units. The industrial series, LUINPZZ, is oils and greases sold for industrial lubricating and other uses measured in thousand gallons. The transportation series, LUTRPZZ, is oils and greases sold for automotive and aviation uses measured in thousand pounds. Prior to use in SEDS, these were converted to thousand barrels by dividing the oil data by 42 gallons per barrel and dividing the greases data by 300 pounds per barrel. In the source document, some State data are not published to avoid disclosing figures for individual companies. The undisclosed data were entered as zero in SEDS.

Data Sources for Lubricants

LUINPZZ — Lubricants sold to the industrial sector by State. Calculated from:

- U.S. Department of Commerce, Bureau of the Census, *Current Industrial Reports*, "Sales of Lubricating and Industrial Oils and Greases," for 1960, 1962, 1965, 1967, 1969, 1971, 1973, 1975, and 1977. (See explanation in Notes 1 and 2 above.)

LUTCPUS — Lubricants total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, Table 2, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

LUTRPZZ — Lubricants sold to the transportation sector by State. Calculated from:

- U.S. Department of Commerce, Bureau of the Census, *Current Industrial Reports*, "Sales of Lubricating and Industrial Oils and Greases," for 1960, 1962, 1965, 1967, 1969, 1971, 1973, 1975, and 1977. (See explanation in Notes 1 and 2 above.)

Motor Gasoline

Physical Units

Nine data series are used to estimate the State end-use consumption of motor gasoline. Eight of the series are from the U.S. Department of Transportation, Federal Highway Administration publication, *Highway Statistics*, and represent sales of motor gasoline. The sales data are categorized as sales for highway and nonhighway use:

- **Highway Use** sales data (MGMFP) are from the *Highway Statistics* Table MF-21; however, they are reduced by the amount of highway "special fuels" (MGSFP) used in each State each year as reported on Table MF-25 (prior to 1994) and Table MF-21 (1994 forward). Special fuels are primarily diesel fuels, not motor gasoline, and are included in the transportation sector of distillate fuel oil.

- **Nonhighway Use** sales are further subdivided into sales for: (1) public use by States, counties, and municipalities (MGPNP) from Table MF-21, and (2) private and commercial use as reported on MF-24.

The private and commercial nonhighway use of motor gasoline has the following components: agricultural use (MGAGP), industrial and commercial use (MGIYP), construction use (MGCUP), marine use (MGMRP), and miscellaneous and unclassified uses (MGMSP). Another component of the private and commercial nonhighway series is aviation gasoline (AVNMM), which is discussed under the "Aviation Gasoline" section of this documentation.

The ninth motor gasoline data series (MGTCPUS) is the total U.S. consumption of motor gasoline published in the product supplied series in the EIA publication *Petroleum Supply Annual*.

The nine motor gasoline data series are ("ZZ" in the variable names represent the two-letter State code that differs for each State):

MGAGPZZ = motor gasoline sold for agricultural use in each State, in thousand gallons;
MGCUPZZ = motor gasoline sold for construction use in each State, in thousand gallons;
MGIYPZZ = motor gasoline sold for industrial and commercial use in each State, in thousand gallons;
MGMFPZZ = motor fuel sold for highway use in each State, in thousand gallons;
MGMRPZZ = motor gasoline sold for marine use in each State, in thousand gallons;
MGMSPZZ = motor gasoline sold for miscellaneous and unclassified uses in each State, in thousand gallons;
MGPNPZZ = motor fuel sold for public nonhighway use in each State, in thousand gallons;
MGSFPZZ = special fuels (primarily diesel fuel with small amounts of liquefied petroleum gases) sold in each State, in thousand gallons; and
MGTCPUS = motor gasoline total consumed in the United States, in thousand barrels.

U.S. totals for the eight State-level series named above are calculated as the sum of the State data.

The transportation sector accounts for most of the motor gasoline sales. Sales to the transportation sector is estimated to be the sum of motor fuel sales for marine use and for highway use (minus the sales of special fuels, which are primarily diesel fuels and are accounted for in the transportation sector of distillate fuel oil). Sales of motor gasoline to the transportation sector in each State (MGTRPZZ) is calculated:

MGTRPZZ = MGMFPZZ + MGMRPZZ – MGSFPZZ

Two sales data series are added to estimate motor gasoline sales to the commercial sector: miscellaneous (including unclassified) and public nonhighway sales. Sales of motor gasoline to the commercial sector in each State (MGCMPZZ) is calculated:

MGCMPZZ = MGMSPZZ + MGPNPZZ

Sales of motor gasoline for use in the industrial sector in each State (MGINPZZ) is calculated as the sum of the sales for agricultural use, for construction use, and for industrial and commercial use:

MGINPZZ = MGAGPZZ + MGCUPZZ + MGIYPZZ

Total sales of motor gasoline in each State (MGTTPZZ) is calculated as the sum of the sales to the major sectors:

MGTTPZZ = MGCMPZZ + MGINPZZ + MGTRPZZ

U.S. totals for the three end-use sectors' sales and for total sales are calculated as the sum of the States' sales.

The motor gasoline sales data for the three end-use sectors in each State are used to apportion the U.S. total consumption of motor gasoline to the States and to the major end-use sectors within each State.

The estimated consumption of motor gasoline in each State is calculated according to each State's share of the total sales. Estimated consumption of motor gasoline in each State (MGTCPZZ) is calculated:

MGTCPZZ = (MGTTPZZ / MGTTPUS) * MGTCPUS

The commercial sector estimated consumption of motor gasoline (MGCCPZZ) is calculated:

MGCCPZZ = (MGCMPZZ / MGTTPZZ) * MGTCPZZ

The industrial sector estimated consumption (MGICPZZ) is calculated:

MGICPZZ = (MGINPZZ / MGTTPZZ) * MGTCPZZ

The transportation sector estimated consumption (MGACPZZ) is calculated:

MGACPZZ = (MGTRPZZ / MGTTPZZ) * MGTCPZZ

The consumption of motor gasoline by major end-use sector in the United States is estimated by summing the States' estimated consumption.

British Thermal Units (Btu)

A national factor, MGTCKUS, is used to convert motor gasoline consumption from physical units to British thermal units for each State. A constant heat content of 5.253 million Btu per barrel is used for 1960 through 1993. Beginning in 1994, an annual quantity-weighted average factor for conventional, reformulated, and oxygenated motor gasoline is calculated by EIA. The factors, listed in Table B1 on page 151, are used for each State:

MGCCBZZ = MGCCPZZ * MGTCKUS
MGICBZZ = MGICPZZ * MGTCKUS
MGACBZZ = MGACPZZ * MGTCKUS
MGTCBZZ = MGCCBZZ + MGICBZZ + MGACBZZ

The U.S. level Btu consumption estimates are calculated by summing the State data.

Additional Calculations

To assist data users in the analysis of consumption of renewable energy sources, which include fuel ethanol, versus non-renewable energy sources, which include motor gasoline, a new data series, motor gasoline excluding fuel ethanol, is created for each State and the United States:

From 1993 forward:
MMTCB = MGTCB - ENTCB

Prior to 1993, fuel ethanol was not included in the motor gasoline data series from the source:
MMTCB = MGTCB

Motor gasoline excluding fuel ethanol is used only in the tables showing energy consumption by source. For consumption by end-use sector, motor gasoline is defined as the product consumed by the end-users, that is, including fuel ethanol.

Data Sources for Motor Gasoline

MGAGPZZ — Motor gasoline sold for agricultural use by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-24.
- 1965 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table G-24 in 1965 and Table MF-24 in 1966 forward.

MGCUPZZ — Motor gasoline sold for construction use by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-24.
- 1965 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table G-24 in 1965 and Table MF-24 in 1966 forward.

MGIYPZZ — Motor gasoline sold for industrial and commercial use by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-24.
- 1965 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table G-24 in 1965 and Table MF-24 in 1966 forward.

MGMFPZZ — Motor fuel sold for highway use by State.

- 1960 through 1995: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, Table MF-221 gives revised U.S. totals. State revisions can be calculated by adding data from Tables MF-225 and MF-226.
- 1996 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table MF-21.

MGMRPZZ — Motor gasoline sold for marine use by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-24.
- 1965 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table G-24 in 1965 and Table MF-24 in 1966 forward.

MGMSPZZ — Motor gasoline sold for miscellaneous uses by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-24. Sum of the "Miscellaneous" column plus the "Unclassified" column minus the "Total Classified" column.
- 1965: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, Table G-24. Sum of the "Miscellaneous" column plus the "Unclassified" column minus the "Total Classified" column.
- 1966 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table MF-24. The specific columns are:
  - 1966 through 1981: Sum of the "Miscellaneous" and "Unclassified" columns.
  - 1982 forward: The "Miscellaneous" column.

MGPNPZZ — Motor fuel sold for public nonhighway use by State.

- 1960 through 1964: U.S. Department of Commerce, Bureau of Public Roads, *Highway Statistics*, Table G-21.
- 1985, 1987, and 1992: Unpublished revised State data comparable to the U.S. values published in *Highway Statistics Summary to 1995*, Table 221.
- 1965 through 1984, 1986, 1988 through 1991, and 1993 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table G-21 in 1965 and Table MF-21 in 1966 forward.

MGSFPZZ — Motor gasoline special fuels sales by State (primarily diesel fuel with small amounts of liquefied petroleum gases).

- 1960 through 1995: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995*, Table MF-225.
- 1996 forward: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm, Table MF-21.

MGTCKUS — Factor for converting motor gasoline from physical units to Btu.

- 1960 through 1993: EIA adopted the Bureau of Mines thermal conversion factor of 5.253 million Btu per barrel for "Gasoline, Motor Fuel" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.
- 1994 forward: EIA calculates national annual quantity-weighted average conversion factors for conventional, reformulated, and oxygenated motor gasolines (shown in Appendix B Table B1 on page 151). The factor for conventional motor gasoline is 5.253 million Btu per barrel, as used for previous years. The factors for reformulated and oxygenated gasolines, both currently 5.150 million Btu per barrel, are based on data published in the Environmental Protection Agency, Office of Mobile Sources, National Vehicle and Fuel Emissions Laboratory report EPA 420-F-95-003, *Fuel Economy Impact Analysis of Reformulated Gasoline*, http://www.epa. gov/otaq/rfgecon.htm.

MGTCPUS — Motor gasoline total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*. "Petroleum Statement, Annual," Table 1.
  For 1960 through 1963, motor gasoline was combined with aviation gasoline and published as "gasoline" in the source table. Table 19 in the "Petroleum Statement, Annual" titled "Salient Statistics of Aviation Gasoline" provided separate data for aviation gasoline for those years. The aviation gasoline data from the second table were subtracted from the gasoline data in the first table to derive the motor gasoline consumption series used in SEDS.
- 1976 through 1980: EIA, *Energy Data Reports*. "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleu

m_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
— 1981 through 2004: Table 2.
— 2005 forward: Table 1.

Petroleum Coke

In the State Energy Data System consumption tables, petroleum coke is included in the category "other petroleum products" (see descriptions beginning on page 70 and summary table on page 30).

Physical Units

Seven data series are used to estimate the consumption of petroleum coke. Five are measures of petroleum coke consumption and two are indicators of industrial activity used to apportion U.S. industrial petroleum coke consumption to the States. "ZZ" in the variable name represents the two-letter State code that differs for each State:

PCTCPUS = petroleum coke total consumed in the United States, in thousand barrels;
PCEIMZZ = petroleum coke consumed by the electric power sector in each State, in thousand short tons;
PCC3MZZ = petroleum coke consumed for combined heat and power in the commercial sector in each State, in thousand short tons;
PCI3MZZ = petroleum coke consumed for combined heat and power in the industrial sector in each State, in thousand short tons;
PCRFPZZ = petroleum coke used at refineries as both catalytic and marketable coke in each State, or group of States, or Petroleum Administration for Defense (PAD) district, in thousand barrels;
CTCAPZZ = catalytic cracking charge capacity of petroleum refineries in each State, in barrels per calendar day (1960 through 1979) and barrels per stream day (1980 forward); and
AICAPZZ = aluminum ingot production capacity in each State, in short tons.

The total consumption of petroleum coke in the United States (PCTCPUS) is the product supplied series from the U.S. Energy Information Administration (EIA) *Petroleum Supply Annual*.

Information on the amount of petroleum coke consumed for the purpose of generating electricity is available from the EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. For the electric power sector (PCEIM), these data are available for 1970 forward. Prior to 1970, consumption is assumed to be zero. For 1989 forward, the electric power sector includes petroleum coke consumed by electric utilities and nonutility power producers whose primary business is to sell electricity or electricity and heat. Quantities of petroleum coke used by commercial (PCC3M) and industrial (PCI3M) facilities in combined-heat-and-power units are also available and are included in the commercial and industrial sectors, respectively.

The data for petroleum coke used to generate electricity are in thousand short tons and are converted into thousand barrels in the State Energy Data System (SEDS) by applying a conversion factor of 5 barrels per short ton, and the U.S. value is the sum of the State data:

PCEIPZZ = PCEIMZZ * 5
PCEIPUS = ΣPCEIPZZ

PCCCPZZ = PCC3MZZ * 5
PCCCPUS = ΣPCCCPZZ

PCI3PZZ = PCI3MZZ * 5
PCI3PUS = ΣPCI3PZZ

To estimate U.S. industrial consumption of petroleum coke, U.S. electric power and commercial consumption are subtracted from the total U.S. petroleum coke product supplied:

PCICPUS = PCTCPUS – PCEIPUS – PCCCPUS

In addition to combined-heat-and-power generation, petroleum coke is used in the industrial sector as catalyst coke at refineries in a process for increasing the yield of gasoline from crude oil (catalytic cracking) and for other industrial uses (mainly for conversion into electrodes that are consumed in the production of aluminum).

State-level estimates of the refinery consumption of petroleum coke are calculated by assuming that each State consumes petroleum coke in proportion to the catalytic cracking charge capacity (CTCAPZZ) of the refineries in the State. The U.S. total for the State-level data allocating series is calculated by summing the State data.

CTCAPUS = ΣCTCAPZZ

Petroleum coke consumed by refineries for 1960 through 1980 is available for some States while quantities for other States are grouped (G1 through G7 as indicated by GZ in the following formulas). The group quantities are allocated to the States within each group in proportion to each State's portion of the group's catalytic cracking charge capacity. For 1981 forward, PAD district data (P1 through P5 as indicated by PZ in the following formulas) are allocated in the same way to the States within each district:

PCRFPZZ = PCRFPZZ, or
PCRFPZZ = (CTCAPZZ / CTCAPGZ) * PCRFPGZ (1 through 7), or
PCRFPZZ = (CTCAPZZ / CTCAPPZ) * PCRFPPZ (1 through 5)
PCRFPUS = ΣPCRFPZZ

U.S. petroleum coke used at combined-heat-and-power plants (PCI3PUS) and at refineries (PCRFPUS) are subtracted from the U.S. industrial sector consumption to derive U.S. consumption of petroleum coke for all other industrial uses:

PCOCPUS = PCICPUS – PCI3PUS – PCRFPUS

State-level estimates of petroleum coke consumed by other industrial users, mainly aluminum production, are assumed to be in proportion to each State's aluminum ingot production capacity (AICAPZZ). For 1993 forward, State-level aluminum production capacity is adjusted to account for under-utilization of the plants. Although AICAPZZ is measured in short tons, it is not converted to thousand barrels because it is used only as a State-level allocator. The U.S. total is calculated as the sum of the State data and other industrial use of petroleum coke is allocated to the States as follows:

AICAPUS = ΣAICAPZZ
PCOCPZZ = (AICAPZZ / AICAPUS) * PCOCPUS

Industrial sector petroleum coke consumption by State is the sum of combined-heat-and-power industrial use, consumption at refineries, and all other industrial uses:

PCICPZZ = PCI3PZZ + PCRFPZZ + PCOCPZZ

Total petroleum coke consumption by State is the sum of commercial, industrial, and electric power sector use:

PCTCPZZ = PCCCPZZ + PCICPZZ + PCEIPZZ

British Thermal Units (Btu)

Petroleum coke has a heat content value of approximately 6.024 million Btu per barrel. This factor is applied to convert estimated petroleum coke consumption from physical units to Btu by State; and the U.S. totals are the sum of the States' values:

PCCCBZZ = PCCCPZZ * 6.024
PCCCBUS = ΣPCCCBZZ

PCICBZZ = PCICPZZ * 6.024
PCICBUS = ΣPCICBZZ

PCEIBZZ = PCEIPZZ * 6.024
PCEIBUS = ΣPCEIBZZ

PCTCBZZ = PCCCBZZ + PCICBZZ + PCEIBZZ
PCTCBUS = ΣPCTCBZZ

Additional Calculations

Additional calculations are performed in SEDS to provide petroleum coke consumption estimates for the price and expenditure calculations. The Btu equivalents of petroleum coke used at refineries (PCRFB), consumed for combined-heat-and-power generation (PCI3B), and consumed by all other industrial users (PCOCB) are calculated at the State and U.S. levels:

PCI3BZZ = PCI3PZZ * 6.024
PCI3BUS = ΣPCI3BZZ

PCOCBZZ = PCOCPZZ * 6.024
PCOCBUS = ΣPCOCBZZ

PCRFBZZ = PCRFPZZ * 6.024
PCRFBUS = ΣPCRFBZZ

Additional Notes on Petroleum Coke

The source for petroleum coke used at refineries, PCRFPUS and PCRFPGZ, is the EIA *Petroleum Supply Annual* and predecessor reports. For 1960 through 1980, the data are provided in thousand short tons. For consistency with later years' data, the 1960 through 1980 data are first converted into thousand barrels before being used in SEDS. For 1960 through 1967, the data are published for Texas and New Mexico and for groups of other States. For 1968 through 1980, the data are given for 19 individual States with the remaining States are combined into 7 groups. The data for 1960 through 1967 are disaggregated into the 19 States and 7 groups used for the later years, prior to being entered into SEDS, by using the proportions of the 1968 data, which was published in both formats. For 1981 forward, the data are published by PAD districts only.

Data Sources for Petroleum Coke

AICAPZZ — Aluminum ingot production capacity in each State.

- 1960 through 1973: American Bureau of Metal Statistics, *Year Book*.
- 1974 through 1994: American Bureau of Metal Statistics, *Non-Ferrous Metal Data*, table titled "Aluminum Ingot Production Capacity."
  Note: Capacities for individual plants owned by one company have been withheld since 1986. The company's total capacity has been apportioned to the individual plants on the basis of their proportional capacities in 1985.
- 1995 forward: U.S. Department of the Interior, U.S. Geological Survey, *Minerals Yearbook*.

CTCAPZZ — Catalytic cracking charge capacity of petroleum refineries by State.

- 1960: Data are unavailable from published reports. The 1961 values are used for 1960.
- 1961 through 1963: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Refineries in the United States." The specific tables are:
  — 1961 and 1962: Table 7, under "Cracking Capacity" column heading "Charge."
  — 1963: Table 6, under "Catalytic-Cracking Capacity" column heading "Charge."
- 1964 through 1976: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Refineries in the United States and Puerto Rico," Table 2, all entries next to "Cat. Ck." summed by State.
- 1977: EIA, *Energy Data Reports*, "Petroleum Refineries in the United States and Puerto Rico," Table 2, all entries next to "Cat. Ck." summed by State.
- 1978: EIA, *Energy Data Reports*, "Petroleum Refineries in the United States and U.S. Territories," Table 2, all entries next to "Cat. Ck." summed by State.
- 1979 and 1980: EIA, *Energy Data Reports*, "Petroleum Refineries in the United States and U.S. Territories." The specific tables are:
  — 1979: Table 2, sum of "Catalytic Cracking" columns, "Fresh" and "Recycle."
  — 1980: Table 1, sum of "Catalytic Cracking (fresh)" and "Catalytic Cracking (recycle)" columns.
- 1981 forward: EIA, *Petroleum Supply Annual*, sum of "Catalytic Cracking (Fresh)" and "Catalytic Cracking (Recycled)" columns in the following tables:
  — 1981 through 1983: Table 1.
  — 1984: Table 30.
  — 1985 through 1989: Table 29.
  — 1989 through 1994: Table 36.
  — 1995: Data series became biannual. 1994 data used for 1995.
  — 1996: Table 36.
  — 1997: 1996 data used for 1997.
  — 1998 through 2004: Table 36, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html.
  — 2005 forward: EIA, *Refinery Capacity Report*, Table 1, http://www.eia.gov/oil_gas/petroleum/data_publications/refinery_capacity_data/refcap_historical.html.

PCC3MZZ — Petroleum coke consumed for combined heat and power in the commercial sector by State.

- 1960 through 1988: No data available. Values are assumed to be zero.
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms.

PCEIMZZ — Petroleum coke consumed by the electric power sector by State.

- 1960 through 1969: No data available. Values are assumed to be zero.
- 1970 forward: EIA, Forms EIA-923, "Power Plant Operations Report," and predecessor forms.

PCI3MZZ — Petroleum coke consumed for combined heat and power in the industrial sector by State.

- 1960 through 1988: No data available. Values are assumed to be zero.
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms.

PCRFPZZ, PCRFPGZ, or PCRFPPZ — Petroleum coke consumed at refineries (both catalyst and marketable) by State or groups of States.

- 1960: No data available. The 1961 value is used for 1960.
- 1961 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual." The specific tables are:
  - 1961 and 1962: Table 18.
  - 1962 through 1966: Table 19.
  - 1967: Table 18.
  - 1968: Table 19.
  - 1969 through 1972: Table 18.
  - 1973 and 1974: Table 21.
  - 1975: Table 22.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual." The specific tables are:
  - 1976: Table 22.
  - 1977: Table 21.
  - 1978 through 1980: Table 20.
- 1981 through 2004: EIA, *Petroleum Supply Annual*. The specific tables are:
  - 1981 and 1982: Table 17.
  - 1983: Table 15.
  - 1984: Table 44.
  - 1985: Table 43.
  - 1986 through 1988: Table 38.
  - 1989 through 1992: Table 45.
  - 1995 and 1997: Table 36.
  - 1993 and 1994, 1996, and 1998 through 2004: http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, Table 47.
- 2005 forward: EIA, EIA, *Refinery Capacity Report*, Table 12 (2006-2008), and Table12a (2009), http://www.eia.gov/oil_gas/petroleum/data_publications/refinery_capacity_data/refcap_historical.html. Also available in the Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_pnp_capfuel_a_(na)_8FPP0_Mbbl_a.htm.

PCTCPUS — Petroleum coke total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*. "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Report*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

Residual Fuel Oil

Physical Units

Since State-level end-use consumption data for residual fuel oil (with the exception of electric power sector data) are not available, sales of residual fuel oil into or within each State, published by the U.S. Energy Information Administration (EIA) in the *Fuel Oil and Kerosene Sales Report*, are used

to estimate residual fuel oil consumption. The following variable names have been assigned to the sales series, in thousand barrels ("ZZ" in the following variable names represents the two-letter State code that differs for each State):

RFBKPZZ = residual fuel oil sold for vessel bunkering use (i.e., the fueling of commercial or private boats, such as pleasure craft, fishing boats, tugboats, and ocean-going vessels, including vessels operated by oil companies, and fueling for other marine purposes), excluding sales to the Armed Forces;

RFCMPZZ = residual fuel oil sold to the commercial sector for heating;

RFIBPZZ = residual fuel oil sold to industrial establishments for space heating and for other industrial use (i.e., for all uses to mines, smelters, plants engaged in producing manufactured products, in processing goods, and in assembling);

RFMIPZZ = residual fuel oil sold to the Armed Forces, regardless of use;

RFMSPZZ = residual fuel oil sold for all other uses not identified in other sales categories;

RFOCPZZ = residual fuel oil sold for oil company use, including all fuel oil, crude oil, or acid sludge used as fuel at refineries, by pipelines, or in field operations; and

RFRRPZZ = residual fuel oil sold to the railroads for use in fueling trains, operating railroad equipment, space heating of buildings, and other operations.

Two other data series that represent consumption of residual fuel oil are:

RFEIPZZ = residual fuel oil consumed by the electric power sector in each State, in thousand barrels.

RFTCPUS = residual fuel oil total supplied in the United States, in thousand barrels.

Residual fuel oil consumed by the electric power sector (RFEIPZZ) is collected by EIA on Form EIA-923, "Power Plant Operations Report," and predecessor forms. (See Note 3 at the end of this residual fuel oil section for further information on changes in this series' data definitions.)

Total U.S. consumption of residual fuel oil, RFTCPUS, is the product supplied series in EIA's publication *Petroleum Supply Annual*.

All State-level data series listed above are summed to provide totals for the United States.

The data series are then combined as closely as possible into the major end-use sectors used in the State Energy Data System (SEDS). No residual fuel oil is sold to the residential sector. Residual fuel oil sales to the commercial sector is the RFCMPZZ series.

The sales of residual fuel oil to the industrial sector in each State, RFINPZZ, is the sum of the residual fuel oil sold for industrial use, including industrial space heating (RFIBPZZ), for oil company use (RFOCPZZ), and for all other uses (RFMSPZZ):

RFINPZZ = RFIBPZZ + RFOCPZZ + RFMSPZZ
RFINPUS = ΣRFINPZZ

The sales of residual fuel oil to the transportation sector in each State, RFTRPZZ, is the sum of the residual fuel oil sales for vessel bunkering (RFBKPZZ), military use (RFMIPZZ), and railroad use (RFRRPZZ):

RFTRPZZ = RFBKPZZ + RFMIPZZ + RFRRPZZ
RFTRPUS = ΣRFTRPZZ

Sales of residual fuel oil to the commercial, industrial, and transportation sectors are added to create a subtotal of sales to all sectors other than the electric power sector (RFNDPZZ):

RFNDPZZ = RFCMPZZ + RFINPZZ + RFTRPZZ
RFNDPUS = ΣRFNDPZZ

The estimated residual fuel oil consumption for the United States by all sectors other than the electric power sector (RFNCPUS) is calculated by subtracting the total residual fuel oil consumption for the electric power sector from the total U.S. residual fuel oil consumption:

RFNCPUS = RFTCPUS – RFEIPUS

This U.S. subtotal of residual fuel oil consumption by the end-use sectors combined (RFNCPUS) is apportioned to the States by using the States' end-use sector sales data. The assumption is made that each State consumes residual fuel oil in proportion to the amount sold in that State:

RFNCPZZ = (RFNDPZZ / RFNDPUS) * RFNCPUS

The end-use sectors' subtotal for each State is further divided into estimates for each sector in proportion to each sector's sales. The estimated commercial sector consumption in each State, RFCCPZZ, is calculated:

RFCCPZZ = (RFCMPZZ / RFNDPZZ) * RFNCPZZ

The industrial sector's estimated consumption in each State, RFICPZZ, is calculated:

RFICPZZ = (RFINPZZ / RFNDPZZ) * RFNCPZZ

The transportation sector's estimated consumption in each State, RFACPZZ, is calculated:

RFACPZZ = (RFTRPZZ / RFNDPZZ) * RFNCPZZ

The consumption of residual fuel oil in the United States by the major end-use sectors is estimated by adding the States' estimated consumption.

Total State residual fuel oil consumption is the sum of the end-use sectors' consumption subtotal and the electric power sector consumption:

RFTCPZZ = RFNCPZZ + RFEIPZZ

British Thermal Units (Btu)

residual fuel oil has a heat content value of approximately 6.287 million Btu per barrel. This factor is applied to convert residual fuel oil estimated consumption from physical units to Btu as shown in the following examples:

RFCCBZZ = RFCCPZZ * 6.287
RFICBZZ = RFICPZZ * 6.287
RFTCBZZ = RFCCBZZ + RFICBZZ + RFACBZZ + RFEIBZZ

The U.S. level Btu consumption estimates are calculated as the sum of the States' Btu consumption.

Additional Notes on Residual Fuel Oil

1. "Sales" data are actually called "shipments" in the source documents for 1960 and 1961; "consumption" for 1962 through 1966; "shipments" for 1967; "sales" from 1968 through 1978; "deliveries" for 1979 through 1983; and "sales" for 1984 forward.

2. In 1979, the EIA implemented a new survey form, EIA-172, to obtain deliveries of fuel oil and kerosene data and updated the list of respondents. (A detailed explanation is published in the *Energy Data Report,* "Deliveries of Fuel Oil and Kerosene in 1979.") In the new survey form, certain end-use categories were redefined—in many cases, to collect more disaggregated data. The reclassifications resulted in some end-use categories that were no longer comparable with those in previous surveys. Where discontinuities occurred, estimates for the pre-1979 years have been made in SEDS to conform with the 1979 fuel oil deliveries classifications. The pre-1979 deliveries estimates are not published in this report but are used in SEDS to disaggregate the known U.S. total product supplied (consumption) into State and major end-use sector consumption estimates.

   For residual fuel oil deliveries in 1979, the end-use categories "commercial" and "industrial" are available. The pre-1979 deliveries categories are called "heating" and "industrial." While the pre-1979 categories individually are not continuous with the 1979 categories, their subtotals are related. That is, a general comparison can be made between the sum of commercial and industrial deliveries in 1979 and the sum of heating and industrial deliveries in the pre-1979 years. Therefore, the following method was applied to present a comparable series for residual fuel oil delivered to the commercial and industrial sectors:

   - For each of the pre-1979 years, a subtotal was created for each State by adding each State's heating and industrial deliveries categories. A comparable 1979 subtotal was created by adding each State's commercial and industrial deliveries categories.

   - Commercial and industrial shares of the subtotal in 1979 were calculated for each State.

- These 1979 end-use shares were then applied to each pre-1979 subtotal of residual fuel oil deliveries in each State to create State estimates of end-use deliveries for 1960 through 1978.

The 1980 through 1982 residual fuel oil deliveries data are based on the same survey as that used for 1979; therefore, the 1980 through 1982 data are directly comparable to 1979 data.

In 1984, EIA again updated the list of respondents for this survey, and the Form EIA-172 became the Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report." EIA did not conduct a fuel oil and kerosene sales survey for 1983. The 1983 estimates in SEDS are based on 1984 data obtained from the Form EIA-821. Statistical procedures and methodologies used for the Form EIA-821 differ from those used in previous years. Therefore, the 1983 and forward sales data may not be directly comparable to the pre-1983 data. (In the source document, the sales data for 1983 forward are reported in thousand gallons. These data were first converted to thousand barrels before being entered into SEDS.)

3. The data on fuel oil consumed by the electric power sector for all years and States are actual fuel oil consumption numbers collected from electric power plants on Form EIA-923, "Power Plant Operations Report," and predecessor forms. Due to changes in fuel oil reporting classifications on the predecessor forms over the years, it is not possible to develop a thoroughly consistent series for all years. However, over time, data more accurately disaggregating fuel oil into distillate fuel oil and residual fuel oil have become available. For 1960 through 1969, only data on total fuel oil consumed at electric utilities by State are available. For 1970 through 1979, fuel oil consumed by plant type (internal combustion and gas turbine plants combined and steam plants) by State are available. For 1980 through 2000, data on consumption of light oil at all plant types combined and consumption of heavy oil at all plant types combined are available by State. For 2001 forward, data on consumption of distillate fuel oil and residual fuel oil are available. In SEDS, the following assumptions have been made:

   - 1960 through 1969 — State estimates of fuel oil consumption by plant type have been created for each year by applying the shares of steam plants (primarily residual fuel oil) and internal combustion and gas turbine plants (primarily distillate fuel oil plus small amounts of jet kerosene) by State in 1970 to each year's total fuel oil consumption at electric utilities for 1960 through 1969.

   - 1970 through 1979 — fuel oil consumed by steam plants is assumed to equal residual fuel oil consumption, and fuel oil consumed by internal combustion and gas turbine plants is assumed to equal distillate fuel oil plus jet kerosene consumption.

   - 1980 through 2000 — total heavy oil consumption at all plant types is assumed to equal residual fuel oil consumption, and total light oil consumption at all plant types is assumed to equal distillate fuel oil plus jet kerosene consumption.

   The data series thus derived for SEDS for residual fuel oil and distillate fuel oil consumption by the electric power sector is considered to be actual consumption by the electric power sector for each State and each year.

Data Sources for Residual Fuel Oil

RFBKPZZ — Residual fuel oil sold for vessel bunkering use by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 and 1961: Table 17.
  - — 1962 and 1963: Table 16.
  - — 1964 and 1965: Table 15.
  - — 1966 through 1975: Table 11.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 11.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A13.

- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VVB_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VVB_Mgal_a.htm.

RFCMPZZ — Residual fuel oil sold to the commercial sector for heating.

- 1960 through 1978: EIA estimates based on statistics of commercial sector deliveries of residual fuel oil from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene in 1979," Table 2. State ratios based on 1979 commercial sector deliveries were applied to each State's sum of heating plus industrial deliveries categories from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 2, on page 66.)
- 1979 and 1980: EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5.

Notes: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS. Data for Hawaii in 1986 through 1990 reflect unpublished revisions from an EIA internal memorandum from the Office of Oil and Gas to the Office of Energy Markets and End Use, "Revising Historical Petroleum Data," February 26, 1993.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A13.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VCS_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VCS_Mgal_a.htm.

RFEIPZZ — Residual fuel oil consumed by the electric power sector.

- EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. The following assumptions have been made:
  - 1960 through 1969: Only total fuel oil consumed at electric utilities by State is available. State estimates of residual fuel oil consumption were created for each year by applying the shares of steam plants (primarily residual fuel oil) by State from 1970 to each year's total fuel oil consumption at electric utilities for 1960 through 1969.
  - 1970 through 1979: Fuel oil consumed by plant type by State is available. Fuel oil consumed by steam plants is assumed to equal residual fuel oil consumption.
  - 1980 through 2000: Consumption of heavy fuel at all plant types by State is available. This is assumed to equal residual fuel oil consumption.
  - 2001 forward: Consumption of residual fuel oil is available.

RFIBPZZ — Residual fuel oil sold to industrial establishments for heating and for other industrial use.

- 1960 through 1978: EIA, estimates based on statistics of industrial sector deliveries of residual fuel from the EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene in 1979," Table 2. State ratios based on 1979 industrial sector deliveries were applied to each State's sum of heating plus industrial deliveries categories from the fuel oil deliveries reports for each year 1960 through 1978. (See explanation in Note 2, on page 66.)
- 1979 and 1980: EIA, *Energy Data Report*, "Deliveries of Fuel Oil and Kerosene," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A13.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_vin_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_vin_Mgal_a.htm.

RFMIPZZ — Residual fuel oil sold to the Armed Forces regardless of use by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - 1960 and 1961: Table 18.
  - 1962 and 1963: Table 17.

  - — 1964 and 1965: Table 16.
  - — 1966 through 1975: Table 12.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 12.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A13.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VMI_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VMI_Mgal_a.htm.

RFMSPZZ — Residual fuel oil sold for miscellaneous uses by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 through 1962: Table 19.
  - — 1963 and 1964: Table 18.
  - — 1965 through 1967: Table 17.
  - — 1968 through 1975: Table 14.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 14.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 2, column "Other."
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5, column "All Other."

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS. The data series is titled "All Other."

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A13.
- 1984 through 1987: EIA, *Petroleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VOE_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VOE_Mgal_a.htm.

RFOCPZZ — Residual fuel oil sold for use by oil companies by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 and 1961: Table 14.
  - — 1962 and 1963: Table 13.
  - — 1964 and 1965: Table 12.
  - — 1966 through 1975: Table 9.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 9.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983: EIA, *Petroleum Marketing Monthly*, July 1985 issue, Table A13.
- 1984 through 1987: EIA, *Petoleum Marketing Monthly*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VOC_Mgal_a.htm.
- 1988 forward: EIA, *Fuel Oil and Kerosene Sales*, also available in Petroleum Navigator, http://www.eia.gov/dnav/pet/pet_cons_821rsd_a_EPPR_VOC_Mgal_a.htm.

RFRRPZZ — Residual fuel oil sold for use by railroads by State.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Shipments of Fuel Oil and Kerosene." The specific tables are:
  - — 1960 and 1961: Table 16.
  - — 1962 and 1963: Table 15.
  - — 1964 and 1965: Table 14.
  - — 1966 through 1975: Table 10.
- 1976 through 1978: EIA, *Energy Data Reports*, "Sales of Fuel Oil and Kerosene," Table 10.
- 1979 and 1980: EIA, *Energy Data Reports*, "Deliveries of Fuel Oil and Kerosene," Table 2.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 5.

Note: Data for 1983 forward are published in thousand gallons. They are converted to thousand barrels by dividing by 42 before being entered into SEDS.

- 1983 through 1987: EIA, *Petroleum Marketing Monthly*. The specific tables are:
  - — 1983: July 1985 issue, Table A13.
  - — 1984 and 1985: July 1986 issue, Table A3.
  - — 1986 and 1987: June 1988 issue, Table A5.
- 1988 and 1989: EIA, *Fuel Oil and Kerosene Sales 1989*, Table 5.
- 1990 forward: Series discontinued. Volumes are included with "All Other" data (in SEDS).

RFTCPUS — Residual fuel oil total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - — 1981 through 2004: Table 2.
  - — 2005 forward: Table 1.

Other Petroleum Products

There are 16 petroleum products that are summed and called "other petroleum products" in the State Energy Data System (SEDS). These products, in thousand barrels, are:

ABTCPUS = aviation gasoline blending components total consumed in the United States;
COTCPZZ = crude oil (including lease condensate) total consumed in each State;
FNTCPUS = petrochemical feedstocks, naphtha less than 401° F, total consumed in the United States;
FOTCPUS = petrochemical feedstocks, other oils equal to or greater than 401° F, total consumed in the United States;
FSTCPUS = petrochemical feedstocks, still gas, total consumed in the United States;
MBTCPUS = motor gasoline blending components total consumed in the United States;
MSTCPUS = miscellaneous petroleum products total consumed in the United States;
NATCPUS = natural gasoline (including isopentane) total consumed in the United States;
PCTCPUS = petroleum coke total consumed in the United States;
PLTCPUS = plant condensate total consumed in the United States;
PPTCPUS = pentanes plus total consumed in the United States;
SGTCPUS = still gas total consumed in the United States;
SNTCPUS = special naphthas total consumed in the United States;
UOTCPUS = unfinished oils total consumed in the United States;
USTCPUS = unfractionated stream total consumed in the United States; and
WXTCPUS = waxes total consumed in the United States.

The methods used to create State estimates for each of these products (except petroleum coke, which is described earlier in the petroleum coke section beginning on page 61) are explained in the following sections. It is assumed that all of these products are used by the industrial sector, except for the small portion of petroleum coke consumed by the electric power and commercial sectors. State estimates are created for other petroleum products by using the following four variables to allocate the products to the States:

COCAPZZ = crude oil operating capacity at refineries in each State, in barrels per calendar day;
OCVAVZZ = value added in the manufacture of industrial organic chemicals in each State, in million dollars;
PIVAVZZ = value added in the manufacture of paints and allied products in each State, in million dollars; and

CGVAVZZ = value added in the manufacture of corrugated and solid fiber boxes, in million dollars.

Value added by manufacture is a measure of manufacturing activity that is derived by subtracting the cost of materials (which covers materials, supplies, containers, fuel, purchased electricity, and contract work) from the value of shipments. This difference is then adjusted by the net change in finished goods and work-in-process between the beginning and end-of-year

inventories. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas. The value added data are from the Department of Commerce *Economic Census (*previously, *Census of Manufactures)* reports.

Crude Oil

Physical Units

State estimates for crude oil consumed in petroleum industry operations are the data series COTCPZZ. The U.S. total for this data series is summed:

COTCPUS = ΣCOTCPZZ

Industrial consumption equals total consumption of crude oil:

COICPZZ = COTCPZZ
COICPUS = COTCPUS

British Thermal Units (Btu)

Crude oil has a heat content value of approximately 5.800 million Btu per barrel. The calculations performed to estimate total Btu consumption and industrial use Btu consumption by State and for the United States are:

COTCBZZ = COTCPZZ * 5.800
COTCBUS = ΣCOTCBZZ
COICBZZ = COTCBZZ
COICBUS = COTCBUS

Data Source

COTCPZZ — Crude oil consumed in petroleum industry operations by State.

- 1960 through 1982: Crude oil used directly was included in distillate and residual fuel oil product supplied when reported to EIA. Zeros are entered for all years.
- 1983 forward: Data are available for Petroleum Administration for Defense (PAD) districts, not by State. State estimates are calculated by allocating all crude oil consumption to the six States (Alaska, California, Colorado, Louisiana, Texas, and Utah) that reported distillate and residual fuel oils consumed by pipeline and leases in 1982. (Data on pipeline and lease consumption of fuels are not available after 1982.) Each State's 1982 ratio of distillate and residual fuel oils consumed by pipeline and leases to its respective 1982 PAD District total consumption of those fuels is calculated. This ratio is then applied to the 1983 forward PAD district totals of crude oil product supplied. The 1982 ratios are taken from the Form EIA-90, "Crude Oil Stocks Report," and the crude oil product supplied data are taken from the EIA *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html. The specific tables are:
  - 1983 through 1988: Tables 2 and 4 through 8.
  - 1989 through 2004: Tables 2, 4, 6, 8, 10, and 12.
  - 2005 forward: Tables 1, 3, 5, 7, 9, and 11.

Aviation Gasoline Blending Components; Petrochemical Feedstocks, Still Gas; Motor Gasoline Blending Components; Still Gas; and Unfinished Oils

Physical Units

The five petroleum products in this category are consumed as refinery fuels. Beginning in 1986, still gas for petrochemical feedstocks and still gas for other uses are reported together in the source document. State consumption estimates of these products are created in proportion to each State's crude oil operating capacity at refineries (COCAPZZ). The U.S. total for this variable is summed:

COCAPUS = ΣCOCAPZZ

Aviation gasoline blending components State and U.S. consumption are estimated:

ABTCPZZ = (COCAPZZ / COCAPUS) * ABTCPUS
ABICPZZ = ABTCPZZ
ABICPUS = ABTCPUS

Petrochemical feedstocks, still gas, State and U.S. consumption are estimated:

FSTCPZZ = (COCAPZZ / COCAPUS) * FSTCPUS
FSICPZZ = FSTCPZZ
FSICPUS = FSTCPUS

Motor gasoline blending components State and U.S. consumption are estimated:

MBTCPZZ = (COCAPZZ / COCAPUS) * MBTCPUS
MBICPZZ = MBTCPZZ
MBICPUS = MBTCPUS

Still gas State and U.S. consumption are estimated:

SGTCPZZ = (COCAPZZ / COCAPUS) * SGTCPUS
SGICPZZ = SGTCPZZ
SGICPUS = SGTCPUS

Unfinished oils State and U.S. consumption are estimated:

UOTCPZZ = (COCAPZZ / COCAPUS) * UOTCPUS
UOICPZZ = UOTCPZZ
UOICPUS = UOTCPUS

British Thermal Units (Btu)

Btu estimates for the five products in this group are developed by multiplying the estimated consumption of each individual product in physical units by its respective heat content conversion factor. The calculations performed to estimate total Btu consumption and industrial use Btu consumption by State and for the United States are:

ABTCBZZ = ABTCPZZ * 5.048
ABTCBUS = ΣABTCBZZ
ABICBZZ = ABTCBZZ
ABICBUS = ABTCBUS

FSTCBZZ = FSTCPZZ * 6.000
FSTCBUS = ΣFSTCBZZ

FSICBZZ = FSTCBZZ
FSICBUS = FSTCBUS

MBTCBZZ = MBTCPZZ * 5.253
MBTCBUS = ΣMBTCBZZ
MBICBZZ = MBTCBZZ
MBICBUS = MBTCBUS

SGTCBZZ = SGTCPZZ * 6.000
SGTCBUS = ΣSGTCBZZ
SGICBZZ = SGTCBZZ
SGICBUS = SGTCBUS

UOTCBZZ = UOTCPZZ * 5.825
UOTCBUS = ΣUOTCBZZ
UOICBZZ = UOTCBZZ
UOICBUS = UOTCBUS

Data Sources

ABTCPUS — Aviation gasoline blending components total consumed in the United States.

- 1960 through 1980: No data available. Values are assumed to be zero.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

COCAPZZ — Crude oil operating capacity at refineries by State.

- 1960: U.S. Department of the Interior, Bureau of Mines, *Petroleum Refineries, Including Cracking Plants, in the United States*, Table 3.
- 1961 through 1963: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Refineries in the United States." The specific tables are:
  - 1961 and 1962: Table 3.
  - 1963: Table 1.

- 1964 through 1976: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Refineries in the United States and Puerto Rico," Table 1.
- 1977: EIA, *Energy Data Reports*, "Petroleum Refineries in the United States and Puerto Rico," Table 1.
- 1978 through 1980: EIA, *Energy Data Reports*, "Petroleum Refineries in the United States and U.S. Territories," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html. The specific tables are:
  - 1981 through 1983: Table 1.
  - 1984: Table 30.
  - 1985 through 1988: Table 29.
  - 1989 through 1994: Table 36.
  - 1995: Unpublished data based on Form EIA-810.
  - 1996 through 2004: Table 36.
- 2005 forward: EIA, *Refinery Capacity Report*, http://www.eia.gov/oil_gas/petroleum/data_publications/refinery_capacity_data/refcap_historical.html, Table 1, column titled "Barrels Per Calendar Day, Operating".

FSTCPUS — Petrochemical feedstocks, still gas, total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, Petroleum Statement, Annual," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 14.
- 1983 through 1985: EIA, *Petroleum Supply Annual*, Table 12.
- 1986 forward: Included in still gas (SGTCPUS).

MBTCPUS — Motor gasoline blending components total consumed in the United States.

- 1960 through 1980: No data available. Values are assumed to be zero.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

SGTCPUS — Still gas total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 and 1982: EIA, *Petroleum Supply Annual*, Table 14.
- 1983 through 1985: EIA, *Petroleum Supply Annual*, Table 12.
- 1986 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1986 through 2004: Table 2.
  - 2005 forward: Table 1.

UOTCPUS — Unfinished oils total consumed in the United States.

- 1960 through 1980: No data available. Values assumed to be zero.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1_historical.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

Petrochemical Feedstocks, Naphtha Less Than 401° F; Petrochemical Feedstocks, Other Oils Equal to or Greater Than 401° F; Miscellaneous Petroleum Products; Natural Gasoline (Including Isopentane); Plant Condensate; Pentanes Plus; and Unfractionated Stream.

Physical Units

The seven petroleum products in this category are allocated to the States in proportion to the value added in the manufacture of industrial organic chemicals in each State (OCVAVZZ).

The two petrochemical feedstocks are consumed by the chemical industry in producing petrochemical "building blocks" that, in turn, are converted to such products as synthetic fibers, synthetic rubber, and plastics.

Miscellaneous products include such products as petrolatum, synthetic natural gas feedstocks, and specialty oils (e.g., hydraulic oils, insulating oils, medicinal oils, rust preventatives, and spray oils). Finished petrochemicals usually constitute the largest volume of miscellaneous product, and it is assumed that the chief consuming industry for this product line is the chemical industry.

Natural gasoline (including isopentane), plant condensate, pentanes plus, and unfractionated stream are included in this group because the chemical industry is the only one that could readily utilize these lighter liquid hydrocarbons (as petrochemical feedstock). Beginning in 1984, in the source document, natural gasoline (including isopentane) and plant condensate are reported together as a new product, pentanes plus. At the same time, unfractionated stream was dropped because its components were reported separately as liquefied petroleum gases.

The U.S. total for the data series used to apportion these products to the States is summed:

OCVAVUS = ΣOCVAVZZ

Total petrochemical feedstocks, naphtha less than 401° F, State and U.S. consumption are estimated:

FNTCPZZ = (OCVAVZZ / OCVAVUS) * FNTCPUS
FNICPZZ = FNTCPZZ
FNICPUS = FNTCPUS

Petrochemical feedstocks, other oils equal to or greater than 401° F, State and U.S. consumption are estimated:

FOTCPZZ = (OCVAVZZ / OCVAVUS) * FOTCPUS
FOICPZZ = FOTCPZZ
FOICPUS = FOTCPUS

Miscellaneous petroleum products State and U.S. consumption are estimated:

MSTCPZZ = (OCVAVZZ / OCVAVUS) * MSTCPUS
MSICPZZ = MSTCPZZ
MSICPUS = MSTCPUS

Natural gasoline (including isopentane) State and U.S. consumption are estimated:

NATCPZZ = (OCVAVZZ / OCVAVUS) * NATCPUS
NAICPZZ = NATCPZZ
NAICPUS = NATCPUS

Plant condensate State and U.S. consumption are estimated:

PLTCPZZ = (OCVAVZZ / OCVAVUS) * PLTCPUS
PLICPZZ = PLTCPZZ
PLICPUS = PLTCPUS

Pentane plus State and U.S. consumption are estimated:

PPTCPZZ = (OCVAVZZ / OCVAVUS) * PPTCPUS
PPICPZZ = PPTCPZZ
PPICPUS = PPTCPUS

Unfractionated stream State and U.S. consumption are estimated:

USTCPZZ = (OCVAVZZ / OCVAVUS) * USTCPUS
USICPZZ = USTCPZZ
USICPUS = USTCPUS

British Thermal Units (Btu)

Btu estimates for the seven petroleum products in this group are developed by multiplying each individual product's estimated consumption in physical units by its respective approximate heat content conversion factor. The calculations performed to estimate total Btu consumption and industrial use Btu consumption by State and for the United States are:

FNTCBZZ = FNTCPZZ * 5.248
FNTCBUS = ΣFNTCBZZ
FNICBZZ = FNTCBZZ
FNICBUS = FNTCBUS

FOTCBZZ = FOTCPZZ * 5.825
FOTCBUS = ΣFOTCBZZ
FOICBZZ = FOTCBZZ
FOICBUS = FOTCBUS

MSTCBZZ = MSTCPZZ * 5.796
MSTCBUS = ΣMSTCBZZ
MSICBZZ = MSTCBZZ
MSICBUS = MSTCBUS

NATCBZZ = NATCPZZ * 4.620
NATCBUS = ΣNATCBZZ
NAICBZZ = NATCBZZ
NAICBUS = NATCBUS

PLTCBZZ = PLTCPZZ * 5.418
PLTCBUS = ΣPLTCBZZ
PLICBZZ = PLTCBZZ
PLICBUS = PLTCBUS

PPTCBZZ = PPTCPZZ * 4.620
PPTCBUS = ΣPPTCBZZ
PPICBZZ = PPTCBZZ
PPICBUS = PPTCBUS

USTCBZZ = USTCPZZ * 5.418
USTCBUS = ΣUSTCBZZ
USICBZZ = USTCBZZ
USICBUS = USTCBUS

Data Sources

FNTCPUS — Petrochemical feedstocks, naphtha, less than 401° F, total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

FOTCPUS — Petrochemical feedstocks, other oils, equal to or greater than 401° F, total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html, column titled "Products Supplied." The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

MSTCPUS — Miscellaneous petroleum products consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*. "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html. The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1. Naphtha-type jet fuel volumes (JNTCPUS) are included in "Miscellaneous Products" in the *Petroleum Supply Annual*, Table 1.

NATCPUS — Natural gasoline total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*. "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*. "Petroleum Statement, Annual," Table 1.
- 1981 through 1983: EIA, *Petroleum Supply Annual*, Table 2.

- 1984 forward: Included in pentanes plus (PPTCPUS).

OCVAVZZ — Value added by the manufacture of industrial organic chemicals by State.

- 1960 through 1970: U.S. Department of Commerce, *1967 Census of Manufactures*, Volume II, Part 2, Standard Industrial Classification (SIC) 2818. The 1963 State data are used for the years 1960 through 1965, and the 1967 State data are used for 1966 through 1970.
- 1971 through 1980: U.S. Department of Commerce, *1977 Census of Manufactures*, Industry Series, SIC 2869. The 1972 State data are used for 1971 through 1975, and the 1977 State data are used for 1976 through 1980.
- 1981 through 1985: U.S. Department of Commerce, *1987 Census of Manufactures* (Final Report), Industry Series, SIC 2869. The 1982 State data are used for 1981 through 1985.
- 1986 through 1995: U.S. Department of Commerce, *1992 Census of Manufactures* (Final Report), Industry Series, SIC 2869. The 1987 State data are used for 1986 through 1990, and the 1992 State data are used for 1991 through 1995.
- 1996 through 2000: U.S. Department of Commerce, *1997 Economic Census, Manufacturing, Industry Series*, EC97M-3251A for North American Industry Classification System (NAICS) 325110 "Petrochemical Manufacturing" and EC97M-3251G for NAICS 325119 "All Other Basic Inorganic Chemical Manufacturing." The value added by manufacture for both categories are summed to create a data series generally comparable to the SIC 2869 used previously. http://www.census.gov/prod/www/ abs/97ecmani.html
- 2001 forward: U.S. Department of Commerce, *2002 Economic Census, Manufacturing, Industry Series*, Table 2, column titled "Value added" data for NAICS series 325110, 325120, and 325199 shown in the reports at http://www.census.gov/econ/census02/guide/INDRPT31.HTM. See Additional Note 2 on page 79 for the methodology used to estimate withheld values.

PLTCPUS — Plant condensate total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*. "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 through 1983: EIA, *Petroleum Supply Annual*, Table 2.
- 1984 forward: Included in pentanes plus (PPTCPUS).

PPTCPUS — Pentanes plus total consumed in the United States.

- 1960 through 1983: Data were reported separately as natural gasoline, isopentane, and plant condensate.
- 1984 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html, column titled "Products Supplied." The specific tables are:
  - 1984 through 2004: Table 2.
  - 2005 forward: Table 1.

USTCPUS — Unfractionated stream total consumed in the United States.

- 1960 through 1978: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1, included in "Plant Condensate."
- 1979 and 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 through 1983: EIA, *Petroleum Supply Annual*, Table 2, column titled "Products Supplied."
- 1984 forward: Included in liquefied petroleum gases (LGTCPUS).

Special Naphthas

Physical Units

Special naphthas are used as paint and varnish thinners and dry cleaning liquids or solvents. This petroleum product is allocated to the States in proportion to the value added in the manufacture of paints and allied products in each State (PIVAVZZ).

The U.S. total for the apportioning data series is calculated:

$$PIVAVUS = \Sigma PIVAVZZ$$

Special naphthas State and U.S. consumption are estimated:

SNTCPZZ = (PIVAVZZ / PIVAVUS) * SNTCPUS
SNICPZZ = SNTCPZZ
SNICPUS = SNTCPUS

British Thermal Units (Btu)

Special naphthas have a heat content value of approximately 5.248 million Btu per barrel. This factor is applied to convert special naphthas estimated consumption from physical units to Btu by State and the United States is the sum of the States:

SNTCBZZ = SNTCPZZ * 5.248
SNTCBUS = ΣSNTCBZZ
SNICBZZ = SNTCBZZ
SNICBUS = SNTCBUS

Data Sources

PIVAVZZ — Value added by the manufacture of paints and allied products by State.

- 1960 through 1970: U.S. Department of Commerce, *1967 Census of Manufactures*, Volume II, Part 2, SIC 2851. The 1963 State data are used for the years 1960 through 1965, and the 1967 State data are used for 1966 through 1970.
- 1971 through 1980: U.S. Department of Commerce, *1977 Census of Manufactures*, Industry Series, SIC 2851. The 1972 State data are used for 1971 through 1975, and the 1977 State data are used for 1976 through 1980.
- 1981 through 1985: U.S. Department of Commerce, *1987 Census of Manufactures* (Final Report), Industry Series, SIC 2851. The 1982 State data are used for the years 1981 through 1985.
- 1986 through 1995: U.S. Department of Commerce, *1992 Census of Manufactures* (Final Report), Industry Series, SIC 2851. The 1987 State data are used for the years 1986 through 1990, and the 1992 State data are used for 1991 through 1995.
- 1996 through 2000: U.S. Department of Commerce, *1997 Economic Census, Manufacturing, Industry Series*, EC97M-3255A for NAICS 325510 "Paint and Coating Manufacturing." http://www.census.gov/prod/ www/abs/97ecmani.html.
- 2001 forward: U.S. Department of Commerce, *2002 Economic Census, Manufacturing, Industry Series*, Table 2, column titled "Value added" data for NAICS series 325510 shown in the reports at http://www.census.gov/econ/census02/guide/INDRPT31.HTM. See Additional Note 2 on page 79 for the methodology used to estimate withheld values.

SNTCPUS — Special naphthas total consumed in the United States.

- 1960 through 1963: Data included in motor gasoline.
- 1964 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html. The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

Waxes

Physical Units

Because petroleum waxes are very cost-effective moisture and gas barriers, food packaging is the largest market for petroleum waxes in the United States, accounting for more than 50 percent of petroleum wax consumption. Therefore, waxes are allocated to the States in proportion to the value added in the manufacture of corrugated and solid fiber boxes (CGVAVZZ).

The U.S. total for this variable is summed:

CGVAVUS = ΣCGVAVZZ

State and U.S. consumption are estimated:

WXTCPZZ = (CGVAVZZ / CGVAVUS) * WXTCPUS
WXICPZZ = WXTCPZZ
WXICPUS = WXTCPUS

British Thermal Units (Btu)

Waxes have a heat content value of approximately 5.537 million Btu per barrel. This factor is applied to convert the estimated consumption of waxes from physical units to Btu by State and the United States is the sum of the States:

WXTCBZZ = WXTCPZZ * 5.537
WXTCBUS = ΣWXTCBZZ
WXICBZZ = WXTCBZZ
WXICBUS = WXTCBUS

Data Sources

CGVAVZZ — Value added by the manufacture of sanitary food containers by State. Beginning with 1992 data, this series became value added by the manufacture of corrugated and solid fiber boxes by State.

- 1960 through 1965: U.S. Department of Commerce, *1963 Census of Manufactures*, Volume II, Part 1, SIC 2654. The 1963 State data are used for the years 1960 through 1965.
- 1966 through 1970: U.S. Department of Commerce, *1967 Census of Manufactures*, Volume II, Part 2, SIC 2654. The 1967 State data are used for 1966 through 1970.
- 1971 through 1980: U.S. Department of Commerce, *1977 Census of Manufactures*, Industry Series, SIC 2654. The 1972 State data are used for 1971 through 1975, and the 1977 State data are used for 1976 through 1980.
- 1981 through 1990: U.S. Department of Commerce, *1982 Census of Manufactures* (Final Report), Industry Series, SIC 2654. The 1982 State data are used for 1981 through 1990.
- 1991 through 1995: U.S. Department of Commerce, *1992 Census of Manufactures* (Final Report), Industry Series, SIC 2653. The 1992 State data are used for 1991 through 1995.
- 1996 forward: U.S. Department of Commerce, *1997 Economic Census, Manufacturing, Industry Series*, EC97M-3222A for NAICS 322211 "Corrugated and Solid Fiber Box Manufacturing." http://www.census.gov/prod/www/abs/97ecmani.html.
- 2001 forward: U.S. Department of Commerce, *2002 Economic Census, Manufacturing, Industry Series*, Table 2, column titled "Value added" data for NAICS series 322211 shown in the reports at http://www.census.gov/econ/census02/guide/INDRPT31.HTM. See Additional Note 2 on page 79 for the methodology used to estimate withheld values.

WXTCPUS — Waxes total consumed in the United States.

- 1960 through 1975: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Annual," Table 1.
- 1976 through 1980: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1.
- 1981 forward: EIA, *Petroleum Supply Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html. The specific tables are:
  - 1981 through 2004: Table 2.
  - 2005 forward: Table 1.

Total Other Petroleum Products

Physical Units

Total other petroleum products is the sum of the 16 "other petroleum products." All of these products are consumed by the industrial sector except for some petroleum coke consumed by the electric power sector (PCEIP), which is calculated in SEDS with electric power fuel consumption, and the commercial sector (PCCCP), which is included with commercial consumption. State and U.S. industrial use of these other petroleum products are calculated:

POICPZZ = ABICPZZ + COICPZZ + FNICPZZ + FOICPZZ + FSICPZZ + MBICPZZ + MSICPZZ + NAICPZZ + PCICPZZ + PLICPZZ + PPICPZZ + SGICPZZ + SNICPZZ + UOICPZZ + USICPZZ + WXICPZZ
POICPUS = ΣPOICPZZ

Total consumption of these products (including petroleum coke consumption in the commercial and electric power sectors) is calculated:

POTCPZZ = ABTCPZZ + COTCPZZ + FNTCPZZ + FOTCPZZ + FSTCPZZ + MBTCPZZ + MSTCPZZ + NATCPZZ + PCTCPZZ + PLTCPZZ + PPTCPZZ + SGTCPZZ + SNTCPZZ + UOTCPZZ + USTCPZZ + WXTCPZZ

POTCPUS = ΣPOTCPZZ

British Thermal Units (Btu)

Estimated consumption of all 16 "other petroleum products" in Btu is the sum of the Btu consumption of each product by the industrial sector. The State and U.S. totals are calculated:

POICBZZ = ABICBZZ + COICBZZ + FNICBZZ + FOICBZZ + FSICBZZ + MBICBZZ + MSICBZZ + NAICBZZ + PCICBZZ + PLICBZZ + PPICBZZ + SGICBZZ + SNICBZZ + UOICBZZ + USICBZZ + WXICBZZ
POICBUS = ΣPOICBZZ

State and U.S. total consumption of these products, which includes petroleum coke consumption in the commercial and electric power sectors, is calculated:

POTCBZZ = ABTCBZZ + COTCBZZ + FNTCBZZ + FOTCBZZ + FSTCBZZ + MBTCBZZ + MSTCBZZ + NATCBZZ + PCTCBZZ + PLTCBZZ + PPTCBZZ + SGTCBZZ + SNTCBZZ + UOTCBZZ + USTCBZZ + WXTCBZZ
POTCBUS = ΣPOTCBZZ

Additional Notes on Other Petroleum Products

1. In the "Energy Consumption Estimates by Source" tables in this report, a petroleum column called "Other" comprises the other products, including petroleum coke consumed by the commercial and electric power sectors (POTCB and POTCP). In the "Industrial Energy Consumption Estimates" tables, the petroleum "Other" column is the other petroleum products consumption total for industrial use (POICB and POICP).

2. The data for "value added by manufacture" that are used to allocate many of the other petroleum products are from the Department of Commerce, Bureau of the Census, *Census of Manufactures* or *Economic Census* reports. For all years, several States' data were withheld from publication to avoid disclosing operations of individual companies. The total withheld data was apportioned to the withheld States on the basis of those States' proportional values in the previous census. Beginning with the 1992 Census, the total withheld value was apportioned to States with withheld data in proportion to the number of employees in that industry in each State. Beginning with the 1997 Census, the published report tables do not list any States that have withheld data. Detail data tables from "American FactFinder" on the Bureau of the Census website, http://factfinder.census.gov/servlet/EconSectorServlet?_lang=en&ds_name=EC0200A1&_SectorId=31, are used to obtain the list of States with data withheld and the number of employees.

   In 1982, all respondents to the Census of Manufactures survey were requested to report their inventories at cost or market prior to accounting adjustments for "last in, first out" cost. This is a change from prior years in which respondents were permitted to value their inventories by using any generally accepted accounting valuation method. Consequently, data for value added by manufacture after 1982 are not comparable to the prior years' data.

Petroleum Summaries

This section describes the method of estimating consumption by the major end-use sectors within the States for all petroleum data series. Table TN3 on page 30 of this section indicates which petroleum products are consumed in each of the five major end-use sectors. In the preceding portions of this section, end-use consumption estimates have been derived for each petroleum product. These petroleum product subtotals are now summed, in physical units of thousand barrels and in Btu, to create estimated end-use consumption for all petroleum products.

Residential Sector

Petroleum products consumed by the residential sector are: distillate fuel oil (DF), kerosene (KS), and liquefied petroleum gases (LG). For the residential sector, the State and U.S. totals in physical units are:

PARCPZZ = DFRCPZZ + KSRCPZZ + LGRCPZZ
PARCPUS = ΣPARCPZZ

State and U.S. totals in Btu are:

PARCBZZ = DFRCBZZ + KSRCBZZ + LGRCBZZ
PARCBUS = ΣPARCBZZ

Commercial Sector

The commercial sector's use of petroleum products includes: distillate fuel oil (DF), kerosene (KS), liquefied petroleum gases (LG), motor gasoline (MG), and residual fuel oil (RF). In physical units, the State and the U.S. totals for the commercial sector are calculated:

PACCPZZ = DFCCPZZ + KSCCPZZ + LGCCPZZ + MGCCPZZ + RFCCPZZ + PCCCPZZ
PACCPUS = ΣPACCPZZ

State and U.S. totals in Btu are:

PACCBZZ = DFCCBZZ + KSCCBZZ + LGCCBZZ + MGCCBZZ + RFCCBZZ + PCCCBZZ
PACCBUS = ΣPACCBZZ

Industrial Sector

Petroleum used in the industrial sector includes: asphalt and road oil (AR); distillate fuel oil (DF); kerosene (KS); liquefied petroleum gases (LG); lubricants (LU); motor gasoline (MG); residual fuel oil (RF); and the 16 products that are already summed in the "other petroleum products" (PO) subtotal. The State and U.S. total estimates in physical units are:

PAICPZZ = ARICPZZ + DFICPZZ + KSICPZZ + LGICPZZ + LUICPZZ + MGICPZZ + RFICPZZ + POICPZZ
PAICPUS = ΣPAICPZZ

State and U.S. totals in Btu are:

PAICBZZ = ARICBZZ + DFICBZZ + KSICBZZ + LGICBZZ + LUICBZZ + MGICBZZ + RFICBZZ + POICBZZ
PAICBUS = ΣPAICBZZ

Transportation Sector

Petroleum products used in the transportation sector are: aviation gasoline (AV), distillate fuel oil (DF), jet fuel (JF), liquefied petroleum gases (LG), lubricants (LU), motor gasoline (MG), and residual fuel oil (RF). The State and U.S. totals in physical units are:

PAACPZZ = AVACPZZ + DFACPZZ + JFACPZZ + LGACPZZ + LUACPZZ + MGACPZZ + RFACPZZ
PAACPUS = ΣPAACPZZ

State and U.S. totals in Btu are:

PAACBZZ = AVACBZZ + DFACBZZ + JFACBZZ + LGACBZZ + LUACBZZ + MGACBZZ + RFACBZZ

PAACBUS = ΣPAACBZZ

Electric Power Sector

Petroleum products consumed by the electric power sector are: distillate fuel oil (DF), jet fuel (JF), petroleum coke (PC), and residual fuel oil (RF). In physical units, the State and U.S. totals are:

PAEIPZZ = DFEIPZZ + JFEUPZZ + PCEIPZZ + RFEIPZZ
PAEIPUS = ΣPAEIPZZ

State and U.S. totals in Btu are:

PAEIBZZ = DFEIBZZ + JFEUBZZ + PCEIBZZ + RFEIBZZ
PAEIBUS = ΣPAEIBZZ

Total Consumption of Petroleum Products

Total consumption of all petroleum products is the sum of all of the individual product totals. The State and U.S. physical unit totals are:

PATCPZZ = ARTCPZZ + AVTCPZZ + DFTCPZZ + JFTCPZZ + KSTCPZZ + LGTCPZZ + LUTCPZZ + MGTCPZZ + RFTCPZZ + POTCPZZ
PATCPUS = ΣPATCPZZ

State and U.S. totals in Btu are:

PATCBZZ = ARTCBZZ + AVTCBZZ + DFTCBZZ + JFTCBZZ + KSTCBZZ + LGTCBZZ + LUTCBZZ + MGTCBZZ + RFTCBZZ + POTCBZZ
PATCBUS = ΣPATCBZZ

Additional Calculations

A few petroleum products are combined for display in the "Other Petroleum" column in tables on total energy consumption and industrial sector energy consumption. They include asphalt and road oil, aviation gasoline (total energy only), kerosene, lubricants, and the 16 petroleum products described in the "other petroleum products" section of the Technical Notes. The variables are calculated in physical unit and Btu, for each State and the United States:

P1TCP = ARTCP + AVTCP + KSTCP + LUTCP + POTCP
P1TCB = ARTCB + AVTCB + KSTCB + LUTCB + POTCB
P1ICP = ARICP + KSICP + LUICP + POICP
P1ICB = ARICB + KSICB + LUICB + POICB

Total petroleum typically reflects motor gasoline including fuel ethanol. To assist data users in the analysis of consumption of renewable energy sources, which include fuel ethanol, versus non-renewable energy sources, which include petroleum products and other fossil fuels, a new data series, total petroleum excluding fuel ethanol, is created for each State and the United States:

From 1993 forward:
PMTCB = PATCB - ENTCB

Prior to 1993, fuel ethanol was not included in the motor gasoline data series from the source:
PMTCB = PATCB

Total petroleum excluding fuel ethanol is used only in the tables showing energy consumption by source. For consumption by end-use sector, total petroleum includes fuel ethanol, as it is included in motor gasoline as it is consumed by the end-users.

Conversion factors for all petroleum products consumed by each sector, as well as data for the residential and commercial sectors combined, are calculated for use in EIA's *Annual Energy Review* and *Monthly Energy Review*.

PARCKUS = PARCBUS / PARCPUS
PACCKUS = PACCBUS / PACCPUS
PAICKUS = PAICBUS / PAICPUS
PAACKUS = PAACBUS / PAACPUS
PAEIKUS = PAEIBUS / PAEIPUS
PATCKUS = PATCBUS / PATCPUS

Consumption of all petroleum products by the residential and commercial sectors combined, in physical units, in Btu, and the average conversion factor, are calculated:

PAHCPUS = PARCPUS + PACCPUS
PAHCBUS = PARCBUS + PACCBUS
PAHCKUS = PAHCBUS / PAHCPUS

Section 5. Renewable Energy

Renewable energy sources included in the State Energy Data System (SEDS) comprise fuel ethanol, wood, waste, hydroelectric, geothermal, wind, photovoltaic, and solar thermal energy.

Fuel Ethanol

Fuel ethanol is used as a gasoline octane enhancer and oxygenate (blended up to 10 percent concentration). A small amount of fuel ethanol is used as an alternative fuel, such as E85. It is typically produced chemically from ethylene, or biologically from fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood. For 1981 forward, fuel ethanol estimates are maintained separately from motor gasoline in SEDS and shown in the State energy consumption data tables to illustrate renewable energy use.

The U.S. total fuel ethanol consumption in SEDS is a series developed by the U.S. Energy Information Administration (EIA) from annual reports of field production of oxygenated gasoline (prior to 2005), finished motor gasoline and motor gasoline blending components adjustments (2005 forward), and refinery and blender net inputs of fuel ethanol (all years). The fuel ethanol series used in SEDS is denatured fuel ethanol, which includes a small amount of denaturant added to the fuel ethanol to make it unfit for human consumption.

Through 2004, the U.S. total is allocated to the States using data series on gasohol or fuel ethanol published by the U.S. Department of Transportation Federal Highway Administration (FHWA).

Beginning in 2005, the State data series is based on several EIA data series and estimates:

- prime supplier sales of conventional (including oxygenated) gasoline and reformulated gasoline by State;
- production of conventional and reformulated gasoline, total and blended with alcohol, by Petroleum Administration for Defense (PAD) District and Refining District;
- a standard ethanol-to-motor gasoline "blend ratio" of 10 percent for all States except California (5.7 percent) and Minnesota (12 percent); and
- estimated fuel ethanol "product supplied" by PAD District and Refining District.

First, a set of preliminary estimates for fuel ethanol blended into motor gasoline is calculated by multiplying the prime supplier sales for the two types of gasoline with the corresponding percent of gasoline blended with alcohol and the "blend ratio", and summing them together for each State. Next, total fuel ethanol "product supplied" by PAD District and Refining District is estimated by adding motor gasoline blending components and finished motor gasoline adjustments (disaggregated to the districts by applying the district shares derived from the fuel ethanol refinery and blending net inputs data) to the fuel ethanol refinery and blending net inputs. Finally, the preliminary fuel ethanol estimates are scaled to the fuel ethanol "product supplied" values by district.

The fuel ethanol data series are identified in SEDS by the following names ("ZZ" in the variable name represents the two-letter State code that differs for each State):

ENTCPUS = fuel ethanol total consumed in the United States, in thousand barrels.

ENTRPZZ = fuel ethanol blended into motor gasoline (1993 forward) or total gasohol sales (1981 through 1992) by State, in thousand gallons.

The U.S. total of the State series, ENTRPZZ, is calculated as the sum of the State data. The U.S. value, ENTCPUS, is allocated to the States in proportion the State estimates, ENTRPZZ:

ENTRPUS = ΣENTRPZZ
ENTCPZZ = (ENTRPZZ / ENTRPUS) * ENTCPUS

Fuel ethanol total consumed by State, ENTCPZZ, is allocated to the commercial, industrial, and transportation sectors according to the motor gasoline consumption share for each sector:

ENACPZZ = (MGACPZZ / MGTCPZZ) * ENTCPZZ
ENCCPZZ = (MGCCPZZ / MGTCPZZ) * ENTCPZZ
ENICPZZ = (MGICPZZ / MGTCPZZ) * ENTCPZZ

The U.S. consumption estimates for the three sectors are calculated as the sum of the States' values.

Fuel ethanol is converted to equivalent British thermal units (Btu) by using a conversion factor of 3.563 million Btu per barrel. See explanation in Appendix B, "Thermal Conversion Factors," at http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html.

ENACBZZ = ENACPZZ * 3.563
ENCCBZZ = ENCCPZZ * 3.563
ENICBZZ = ENICPZZ * 3.563
ENACBUS = ΣENACBZZ
ENCCBUS = ΣENCCBZZ
ENICBUS = ΣENICBZZ

Total U.S. consumption in Btu is the sum of the sectors' consumption:

ENTCBUS = ENACBUS + ENCCBUS + ENICBUS

Beginning in 1981, energy losses and co-products from the production of fuel ethanol are incorporated into State and U.S. industrial sector energy consumption (TEICBZZ and TEICBUS). This concept is defined as the difference between the heat content of the biomass inputs to the production of fuel ethanol and the heat content of the fuel ethanol produced. Energy losses for the United States are allocated to the States according to the fuel ethanol production share for each State. Energy losses for each State and the U.S. are then added to State and U.S. industrial and total energy consumption.

ENLCBUS = energy losses and co-products from the production of fuel ethanol for the United States, in billion Btu.
ENPRBUS = production of fuel ethanol for the United States, in billion Btu.
ENPRBZZ = production of fuel ethanol by State, in billion Btu.

ENLCBZZ = (ENPRBZZ / ENPRBUS) * ENLCBUS

Additional Notes

Fuel ethanol data blended into motor gasoline (ENTRPZZ) are published in FHWA *Highway Statistics* from 1993 through 2001, 2003, and 2004.

In 2002, fuel ethanol blended into motor gasoline is not available from *Highway Statistics*. The ratio of each State's fuel ethanol in gasohol to total gasohol consumption is calculated for 2001 and 2003. The two ratios for each State are averaged and the average is applied to each State's 2002 total gasohol consumption to derive the amount of fuel ethanol consumed in gasohol in 2002. Fuel ethanol and gasohol data for Florida, Massachusetts, and Rhode Island are available for only 2001 or 2003; in these instances, the ratio of only the available year is used.

Data Sources

ENLCBUS — Energy losses and co-products from the production of fuel ethanol for the United States.
- 1981 forward: EIA, *Annual Energy Review 2009*, Table 10.3.

ENPRBUS — Production of fuel ethanol by State.
- 1981 forward: EIA, *Annual Energy Review 2009*, Table 10.3.

ENPRBZZ — Production of fuel ethanol by State.
- 1981 forward: EIA, State Energy Data System, production estimates.

ENTCPUS — Fuel ethanol consumed total in the United States.
- 1960 through 1980: No data are available. Values are assumed to be zero.
- 1981 through 1992:
  - 1981, 1984, 1987, and 1989: EIA, *Estimates of U.S. Biofuels Consumption 1990*, Table 10.
  - 1982 and 1983: EIA, Office of Coal, Nuclear, Electric, and Alternate Fuels estimates.

— 1985, 1986, 1988, and 1991: Values interpolated.
— 1990 and 1992: EIA, *Estimates of U.S. Biomass Energy Consumption 1992*, Table D1.

- 1993 through 2004: EIA estimates based on data in the EIA *Petroleum Supply Annual, (PSA)* Tables 2 and 16. Ten percent of the "Field Production" of "Oxygenated Finished Motor Gasoline" from the *PSA* Table 2 is added to the "Refinery Input of Fuel Ethanol" from the *PSA* Table 16.
- 2005 forward: EIA estimates based on data in the EIA *PSA*, Tables 1 and 15. Motor gasoline blending components adjustments and finished motor gasoline adjustments from *PSA*, Table 1, are added to fuel ethanol refinery and blender net inputs from *PSA*, Table 15.

ENTRPZZ — Fuel ethanol blended into motor gasoline by State.

- 1960 through 1980: Values are set to be zero.
- 1981 through 1992: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995,* Table MF-233GLA.
- 1993 through 1995: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics, Summary to 1995,* Table MF-233E, column titled "Total Ethanol Used in Gasohol."
- 1996 through 2001, 2003, and 2004: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics*, Table MF-33E, column titled "Total Ethanol Used in Gasohol."
- 2002: EIA estimates based on the 2001 and 2003 data from *Highway Statistics.* For an explanation of the estimation methodology, see the "Additional Notes" on page 84.
- 2005 forward: EIA estimates based on sales of motor gasoline from the *Prime Supplier Report*, production of motor gasoline (with and without alcohol) and estimated ethanol "product supplied" from *PSA*, and State-level ethanol-to-motor-gasoline "blend ratios." See explanation of the estimation methodology on page 83.

Geothermal Energy

Geothermal energy used as direct heat or from heat pumps in the residential, commercial, and industrial sectors is included in the State Energy Data System (SEDS) for 1989 forward. Electric power sector consumption in SEDS includes geothermal energy input at electric utilities for all years, 1960 forward, and includes geothermal energy used to generate electricity by nonutility power producers for 1989 forward. These data series are identified in SEDS by the following names ("ZZ" in the variable name represents the two-letter State code that differs for each State):

GECCBZZ = direct use of geothermal energy and geothermal heat pumps in the commercial sector by State, in billion British thermal units (Btu);
GEEGPZZ = electricity produced from geothermal energy by the electric power sector by State, in million kilowatthours;
GEICBZZ = direct use of geothermal energy and geothermal heat pumps in the industrial sector by State, in billion Btu; and
GERCBZZ = direct use of geothermal energy and geothermal heat pumps in the residential sector by State, in billion Btu.

The U.S. totals for the State-level series are calculated by summing the State data:

GECCBUS = ΣGECCBZZ GEICBUS = ΣGEICBZZ
GEEGPUS = ΣGEEGPZZ GERCBUS = ΣGERCBZZ

To convert electricity produced from geothermal energy from kilowatthours into comparable Btu, a U.S. average factor that varies by year is used. The values for the factor, GEETKUS, are shown in Appendix B, Table B1, http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html.

GEETKUS = factor for converting electricity produced from geothermal energy from kilowatthours to Btu.

The values for the electric power sector in each State are converted to Btu and the U.S. total is the sum of the State data:

GEEGBZZ = GEEGPZZ * GEETKUS
GEEGBUS = ΣGEEGBZZ

The State totals for geothermal energy are the sum of the residential, commercial, and industrial sectors' use and the electric power sector's geothermal-based generation. The U.S. total is the sum of the State data.

GETCBZZ = GERCBZZ + GECCBZZ + GEICBZZ + GEEGBZZ

GETCBUS = ΣGETCBZZ

Additional Notes

Consumption estimates of geothermal energy from direct use and heat pumps in the residential, commercial, and industrial sectors are from the Oregon Institute of Technology Geo-Heat Center. State data for 1989 and 1994 are based on surveys of geothermal equipment producers, distributors, and installers and State energy offices. State estimates from 1998 forward are developed by the Geo-Heat Center from discussions with industry sources.

The State data for 1989, 1994, and 1998 are used by the U.S. Energy Information Administration (EIA) to estimate the State values for intervening years. States with the same value in two survey years are assigned that value for each intervening year. For States with increases or decreases in the survey data, the difference is allocated evenly over the intervening years. If a State went from zero to a value or from a value to zero, it was given zero in the intervening years. The State data for each intervening year are summed and States with increasing or decreasing values are adjusted until the U.S. total equals the U.S. total estimated by the Oregon Institute of Technology Geo-Heat Center.

Data Sources

GECCBZZ — Direct use and heat pump geothermal energy in the commercial sector.

- 1960 through 1988: No data available. Values assumed to be zero.
- 1989: Oregon Institute of Technology Geo-Heat Center, unpublished tables (April 1999) based on a survey.
- 1990 through 1993: U.S. totals are estimates from the Oregon Institute of Technology Geo-Heat Center, unpublished tables. State data for 1989 and 1994 are used to estimate State values for the intervening years. For an the explanation of the estimation methodology, see the "Additional Note" on page 86.
- 1994: Oregon Institute of Technology Geo-Heat Center, unpublished tables (April 1999) based on a survey.
- 1995 through 1997: U.S. totals are from the Oregon Institute of Technology Geo-Heat Center, unpublished tables. State data for 1994 and 1998 are used to estimate State values for the intervening years. For an the explanation of the estimation methodology, see the "Additional Note" on page 86.
- 1998 forward: Oregon Institute of Technology Geo-Heat Center, unpublished tables based on informal surveys and estimations.

GEETKUS — Factor for converting electricity produced from geothermal energy from physical units to Btu.

- 1960 through 1981: Calculated by EIA by weighting the annual average heat rates of operating geothermal units by the installed nameplate capacities as reported on Federal Power Commission Form 12.
- 1982 forward: Estimated annually by the EIA on the basis of an informal survey of relevant plants.

GEEGPZZ — Electricity produced from geothermal energy by the electric power sector for each State.

- 1960 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms.

GEICBZZ — Direct use and heat pump geothermal energy in the industrial sector.

- 1960 through 1988: No data available. Values assumed to be zero.
- 1989: Oregon Institute of Technology Geo-Heat Center, unpublished tables (April 1999) based on a survey.
- 1990 through 1993: U.S. totals are estimates from the Oregon Institute of Technology Geo-Heat Center, unpublished tables. State data for 1989 and 1994 are used to estimate State values for the intervening years. For an the explanation of the estimation methodology, see the "Additional Note" on page 86.
- 1994: Oregon Institute of Technology Geo-Heat Center, unpublished tables, (April 1999) based on a survey.
- 1995 through 1997: U.S. totals are from the Oregon Institute of Technology Geo-Heat Center, unpublished tables. State data for 1994 and 1998 are used to estimate State values for the intervening years. For an the explanation of the estimation methodology, see the "Additional Note" on page 86.
- 1998 forward: Oregon Institute of Technology Geo-Heat Center, unpublished tables based on informal surveys and estimations.

GERCBZZ — Direct use and heat pump geothermal energy in the residential sector.

- 1960 through 1988: No data available. Values assumed to be zero.
- 1989: Oregon Institute of Technology Geo-Heat Center, unpublished tables (April 1999) based on a survey.
- 1990 through 1993: U.S. totals are estimates from the Oregon Institute of Technology Geo-Heat Center, unpublished tables. State data for 1989 and 1994 are used to estimate State values for the intervening years. For an the explanation of the estimation methodology, see the "Additional Note" on page 86.
- 1994: Oregon Institute of Technology Geo-Heat Center, unpublished tables (April 1999) based on a survey.
- 1995 through 1997: U.S. totals are from the Oregon Institute of Technology Geo-Heat Center, unpublished tables. State data for 1994 and 1998 are used to estimate State values for the intervening years. For an the explanation of the estimation methodology, see the "Additional Note" on page 86.
- 1998 forward: Oregon Institute of Technology Geo-Heat Center, unpublished tables based on informal surveys and estimations.

Hydroelectric Power

Electricity produced from hydropower is included in the State Energy Data System (SEDS) in the industrial and electric power sectors for all years, 1960 forward, and in the commercial sector for 1989 forward. In the electric power sector, there are two types of hydroelectric power: conventional hydroelectric power and pumped storage hydroelectricity. Conventional hydroelectric power uses falling water to drive turbines to produce electricity. Pumped storage hydroelectricity is generated by releasing water that has been pumped into an elevated storage reservoir during off-peak periods to drive the turbines during times of peak demand. Electricity produced from pumped storage, when it can be identified separately, is not included in energy consumption estimates because the energy that was used to pump the water is already accounted for. The hydroelectric power data series included in SEDS are identified by the following names ("ZZ" in the name represents the two-letter State code that differs for each State):

HVEGPZZ = electricity produced by conventional hydroelectric power in the electric power sector by State, in million kilowatthours;

HVC5PZZ = electricity produced by conventional hydroelectric power at commercial facilities by State, in million kilowatthours;

HVI5PZZ = electricity produced by conventional hydroelectric power at industrial facilities by State, in million kilowatthours;

The U.S. value for each of the series is the sum of the State data.

Total use of hydroelectric power in the commercial, industrial, and electric power sectors is assumed to be the electricity produced by conventional hydroelectric power. The U.S. total for each sector is the sum of the State values:

HYCCPZZ = HVC5PZZ
HYCCPUS = ΣHYCCPZZ

HYICPZZ = HVI5PZZ
HYICPUS = ΣHYICPZZ

HYEGPZZ = HVEGPZZ
HYEGPUS = ΣHYEGPZZ

Electricity produced from hydroelectric power is converted from kilowatthours to British thermal units (Btu) by using the U.S. average heat content of fossil fuels consumed at steam-electric power plants, FFETKUS, as a conversion factor. The annual values for this factor are shown in the Consumption Technical Notes, Appendix B, Table B1, http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html.

FFETKUS = factor for converting hydroelectric power from kilowatthours to Btu.

HYCCBZZ = HYCCPZZ * FFETKUS
HYICBZZ = HYICPZZ * FFETKUS
HYEGBZZ = HYEGPZZ * FFETKUS

The U.S. value for each of the series is the sum of the State data.

Total hydroelectricity consumption for each State is the sum of the commercial, industrial, and electric power sectors' generation.

HYTCPZZ = HYCCPZZ + HYICPZZ + HYEGPZZ
HYTCPUS = ΣHYTCPZZ

HYTCBZZ = HYCCBZZ + HYICBZZ + HYEGBZZ
HYTCBUS = ΣHYTCBZZ

Data Sources

FFETKUS — Fossil-fueled steam-electric power plant conversion factor.

- 1960 through 1988: Estimated by EIA as the weighted annual average heat rate for fossil-fueled steam-electric plants in the United States as published in the EIA, *Electric Plant Cost and Power Production Expenses 1991*, Table 9.
- 1989 through 2000: Calculated annually by EIA by using heat rate data reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms); and net generation data reported on Form EIA-759, "Monthly Power Plant Report." The computation includes data for all electric utility steam-electric plants using fossil fuels.
- 2001 forward: Calculated annually by EIA by using fuel consumption and net generation data reported on Form EIA-923, "Power Plant Operations Report," and predeccessor forms. The computation includes data for all electric utilities and electricity-only independent power producers using fossil fuels.

HVC5PZZ — Electricity produced from conventional hydroelectric power at the commercial facilities by State.

- 1960 through 1988: No data available. Values are assumed to be zero.
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms.

HVI5PZZ — Electricity produced from conventional hydroelectric power at industrial facilities by State.

- 1960 through 1978: Federal Power Commission, Form 4, "Monthly Power Plant Report."
- 1979 and 1980: EIA estimates based on previous years' data.
- 1981 through 1988: No data available. The 1980 data are repeated for each year.
- 1989 forward: EIA, Forms EIA-923, "Power Plant Operations Report," and predecessor forms.

HVEGPZZ — Electricity produced from conventional hydroelectric power by the electric power sector (includes pumped storage hydroelectric power through 1989) by State.

- 1960 through 1977: Federal Power Commission, News Release, "Power Production, Fuel Consumption, and Installed Capacity Data."
- 1978 through 1980: EIA, *Energy Data Reports*, "Power Production, Fuel Consumption and Installed Capacity Data."
- 1981 through 1988: EIA, Form EIA-759, "Monthly Power Plant Report," and predecessor forms. The data rounded to gigawatthours are published in the following reports:
  - 1981 through 1985: EIA, *Electric Power Annual 1985*, Table 6.
  - 1986 and 1987: EIA, *Electric Power Annual 1987*, Table 18.
  - 1988: EIA, *Electric Power Annual 1989*, Table 14.
- 1989 forward: EIA, Forms EIA-923, "Power Plant Operations Report," and predecessor forms.

Solar Energy

Estimates of solar energy use for the residential and commercial sectors combined and the industrial sector are included in the State Energy Data System (SEDS) for 1989 forward. Generation of electricity by the electric power sector from solar energy sources is included in SEDS for 1984 forward.

Residential/Commercial Sector

Solar thermal energy use in the residential and commercial sectors combined in the United States is estimated by the U.S. Energy Information Administration (EIA) in billion British thermal units (Btu) and published in the EIA *Annual Energy Review* for 1989 forward. A State-level series for allocating the U.S. total to the States is developed by EIA from accumulated data on shipments of solar thermal collectors to States, measured in square feet, as collected on the EIA Form EIA-63A, "Annual Solar Thermal Collector Manufacturers Survey," and predecessor forms. The data are published for recent years in the EIA *Renewable Energy Annual*. The assumption is made that the retirement/replacement period for solar thermal collectors is 20 years. See "Additional Notes on Solar Energy" on

page 89 for more details. The data series are identified in SEDS by the following names ("ZZ" in the variable name represents the two-letter State code that differs for each State):

SOHCBUS = solar thermal direct use energy, and photovoltaic electricity net generation (converted to Btu using the fossil-fueled plants heat rate), in the residential and commercial sectors combined in the United States, in billion Btu; and

SOTTPZZ = rolling 20-year accumulation of shipments of solar thermal energy collectors by State, in square feet.

The U.S. total of shipments of solar thermal energy collectors is calculated as the sum of the State data, and the U.S. residential/commercial solar energy use is allocated to the States as follows:

SOTTPUS = ΣSOTTPZZ
SOHCBZZ = (SOTTPZZ / SOTTPUS) * SOHCBUS

Electric Power Sector

The electric power sector includes estimates of electricity produced from photovoltaic and solar thermal energy sources by electric utilities for 1984 forward, and by both electric utilities and nonutility power producers for 1989 forward. The data series is identified in SEDS by the following name ("ZZ" in the variable name represents the two-letter State code that differs for each State):

SOEGPZZ = electricity produced from photovoltaic and solar thermal energy sources by the electric power sector, for each State, in million kilowatthours.

The U.S. total for this series is calculated as the sum of the State data:

SOEGPUS = ΣSOEGPZZ

Electricity produced from photovoltaic and solar thermal energy in the electric power sector is converted from kilowatthours to Btu by using a conversion factor that is the U.S. average heat content of fossil fuels consumed at steam-electric power plants, FFETKUS. The annual values for this factor are shown in Appendix B, Table B1, http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html.

FFETKUS = factor for converting electricity produced from solar energy sources from kilowatthours to Btu.

The values for the electric power sector in each State are converted to Btu and the U.S. total is the sum of the State data:

SOEGBZZ = SOEGPZZ * FFETKUS
SOEGBUS = ΣSOEGBZZ

Each State's total use of photovoltaic and solar thermal energy sources is the sum of the sectors' values, and the U.S. total is the sum of the States' totals:

SOTCBZZ = SOHCBZZ + SOEGBZZ
SOTCBUS = ΣSOTCBZZ

Additional Notes on Solar Energy

Shipments of solar thermal collectors in the United States, in thousand square feet, for 1974 forward are collected on the EIA Form EIA-63A, "Annual Solar Thermal Collector Manufacturers Survey," (and predecessor forms) and used to develop this series for 1989 forward. The data are accumulated year to year on the assumption that the replacement/retirement period for solar thermal collectors is 20 years. Data for 1974 through 1985 are available for the U.S. total only and are allocated to the States by using an allocating series that is the average of the 1986 and 1987 shipments (the first years State-level data were collected). The ratios of the average 1986 and 1987 State values to the average 1986 and 1987 U.S. value are applied to the national annual values for each year, 1974 through 1985. Beginning in 1986, the U.S. data are adjusted to remove Puerto Rico and the Virgin Islands.

Shipments of solar thermal collectors include high-temperature parabolic dish or trough collectors used by the electric power sector. Data for California (1986 through 1996, 1998 through 2001, and 2008), Arizona (2005), and Nevada (2006) are reduced by the shipments of high-temperature parabolic dish or trough collectors to the electric power sector as shown in the *Renewable Energy Annual*. See SOTTPZZ Data Sources on page 90 for source table details.

Data Sources

FFETKUS — Fossil-fueled steam-electric power plant conversion factor.

- 1960 through 1988: Estimated by EIA as the weighted annual average heat rate for fossil-fueled steam-electric plants in the United States as published in the EIA, *Electric Plant Cost and Power Production Expenses 1991*, Table 9.
- 1989 through 2000: Calculated annually by EIA by using heat rate data reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms); and net generation data reported on Form EIA-759, "Monthly Power Plant Report." The computation includes data for all electric utility steam-electric plants using fossil fuels.
- 2001 forward: Calculated annually by EIA by using fuel consumption and net generation data reported on Form EIA-923, "Power Plant Operations Report," and its predecessor forms. The computation includes data for all electric utilities and electricity-only independent power producers using fossil fuels.

SOEGPZZ — Electricity produced from photovoltaic and solar thermal energy sources by the electric power sector by State.

- 1960 through 1983: No data available. Values are assumed to be zero.
- 1984 through 1988: EIA, Form EIA-759, "Monthly Power Plant Report."
- 1989 forward: EIA, Forms EIA-923, "Power Plant Operations Report," and predecessor forms.

SOHCBUS — Solar thermal direct use energy, and photovoltaic electricity net generation (converted to Btu using the fossil-fueled plants heat rate), in the residential and commercial sectors combined in the United States.

- 1960 through 1988: No data available. Values are zero.
- 1989 forward: EIA, *Annual Energy Review 2009,* Table 10.2a.

SOTTPZZ — Rolling 20-year accumulation of shipments of solar thermal energy collectors by State.

- 1960 through 1988: Values are set to zero in SEDS for consistency with SOHCBUS.
- 1989 forward: Shipments of solar thermal collectors in the United States, in thousand square feet, for 1974 forward are collected on the EIA Form EIA-63A, "Annual Solar Thermal Collector Manufacturers Survey," (and predecessor forms) and used to develop this series for 1989 forward. The sources for these data series are:

— 1986 through 1993: EIA, *Solar Collector Manufacturing Activity* for each year. The specific table numbers are:
  - 1986 through 1988, 1990: Table 5.
  - 1989: Table 4.
  - 1991 and 1992: Table 13.
  - 1993: Table 12.

— 1994 forward: EIA, *Renewable Energy Annual*. Data are from the report of the following year (i.e., 1994 data are published in the *Renewable Energy Annual 1995*) for 1994 through 2000. Beginning in 2001, data are from the report of the same year. The specific tables are:
  - 1994: Table 13.
  - 1995: Table F9.
  - 1996: Table 16.
  - 1997: Table 15.
  - 1998 and 1999: Table 12.
  - 2000: Unpublished data.
  - 2001 through 2003: Table 14.
  - 2004 and 2005: Table 34.
  - 2006: Table 2.6.

Note: High-temperature parabolic dish or trough collectors shipped to the electric power sector are deducted from the solar thermal collector shipments. They are available in the following tables:

— 1986 through 1993: EIA, *Renewable Energy Annual 1995*, Table 13.

— 1994 forward: EIA, *Renewable Energy Annual*. Data are from the report of the following year (i.e., 1994 data are published in the *Renewable Energy Annual 1995*) for 1994 through 2000. Beginning in 2001, data are from the report of the same year. The specific tables are:
  - 1994: Table H3.
  - 1995: Table F10.
  - 1996: Table 17.
  - 1997: Table 19.
  - 1998 and 1999: Table 16.
  - 2000: Unpublished data.
  - 2001 through 2003: Table 18.

- 2004 and 2005: Table 38.
- 2006: Table 2.10.
- 2007 forward: Table 2.13.

Wind Energy

Wind energy used to produce electricity by the electric power sector is included in the State Energy Data System (SEDS) for 1983 forward. The data are identified in SEDS by the following name ("ZZ" in the variable name represents the two-letter State code that differs for each State):

WYEGPZZ = electricity produced from wind energy by the electric power sector, by State, in million kilowatthours; and

The U.S. total is calculated as the sum of the State data:

WYEGPUS =ΣWYEGPZZ

Electricity produced from wind energy by the electric power sector is converted from kilowatthours to British thermal units (Btu) by using a conversion factor that is the U.S. average heat content of fossil fuels consumed at steam-electric power plants, FFETKUS. The annual values for this factor are shown in Appendix B, Table B1, http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html.

FFETKUS = factor for converting electricity produced from wind energy from kilowatthours to Btu.

The values for the electric power sector in each State are converted to Btu and the U.S. total is the sum of the State data:

WYEGBZZ = WYEGPZZ * FFETKUS
WYEGBUS = ΣWYEGBZZ

The State and U.S. totals for wind energy are calculated:

WYTCBZZ = WYEGBZZ
WYTCBUS = ΣWYTCBZZ

Data Sources

FFETKUS — Fossil-fueled steam-electric power plant conversion factor.

- 1960 through 1988: Estimated by EIA as the weighted annual average heat rate for fossil-fueled steam-electric plants in the United States as published in the EIA, *Electric Plant Cost and Power Production Expenses 1991*, Table 9.
- 1989 through 2000: Calculated annually by EIA by using heat rate data reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms); and net generation data reported on Form EIA-759, "Monthly Power Plant Report." The computation includes data for all electric utility steam-electric plants using fossil fuels.
- 2001 forward: Calculated annually by EIA by using fuel consumption and net generation data reported on Form EIA-923, "Power Plant Operations Report," and predecessor forms. The computation includes data for all electric utilities and electricity-only independent power producers using fossil fuels.

WYEGPZZ — Electricity produced from wind energy by the electric power sector by State.

- 1960 through 1982: No data available. Values are assumed to be zero.
- 1983 through 1988: EIA, Form EIA-759, "Monthly Power Plant Report."
- 1989 forward: EIA, Forms EIA-923, "Power Plant Operations Report," and predecessor forms.

Wood and Waste

Different forms of wood and waste are used by each consuming sector. The residential sector burns wood for space heating. The commercial sector uses wood for space heating, and wood, municipal waste and land fill gas for steam heat and electricity generation. The industrial sector uses combustible industrial by-products and wood chips for electricity generation and process steam. The electric power sector uses wood, industrial wood waste and waste gas, and municipal waste as cofiring or primary fuels to produce electricity. Consumption of wood and waste in all sectors is included in the State Energy Data System (SEDS) for 1960 forward. Wood includes wood and wood-derived fuels. Waste is biomass waste

which includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, etc. Prior to 2001, waste also includes non-biomass waste (municipal solid waste from non-biogenic sources, and tire-derived fuels).

Residential Sector

Physical Units

Estimates of wood consumed in the residential sector by State for 1960 through 1979 are from the U.S. Energy Information Administration (EIA) *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*. For 1980 forward, State estimates are developed from U.S. totals published in the EIA *Annual Energy Review (AER)*, from Census division data collected on the EIA triennial survey, *Residential Energy Consumption Survey (RECS)* for 1981, 1984, 1987, 1990, 1993, 1997, 2001, and 2005 and from U.S. Department of Commerce, Bureau of the Census, annual estimates of number of housing units per State. The 1981 *RECS* provides wood consumption data for the national total and Census Regions. For all other years, *RECS* provides data for the national total and Census divisions. In addition, the survey sample size of the 1993, 1997, and 2001*RECS* were large enough to provide data for California, Florida, New York, and Texas. For 2005, *RECS* only provides data for California, New York, and Texas. An estimate for Florida is derived from the 2005 *RECS* microdata. Estimates for the other States in 1993, 1997, 2001, and 2005, and for all States in the other years are developed by allocating the U.S. total from the *AER* to the Census divisions or regions in proportion to *RECS* data. The regional values are then allocated to the States within the regions in proportion to the Census Bureau housing units per State. Estimates for the years intervening the *RECS* surveys are based on the annual U.S. totals from the *AER* and the State proportions of the preceding available *RECS*, i.e., 1982 and 1983 estimates are based on the State proportions of the 1981 data. On the basis of *RECS* data, the assumption is made that no wood is consumed in the residential sector in Hawaii.

The State data derived above are used in SEDS as wood consumption in the residential sector, identified in the system as WDRCPZZ. "ZZ" in the following variable name represents the two-letter State code that differs for each State.

WDRCPZZ = wood consumed in the residential sector of each State, in thousand cords.

The State-level data are summed to a U.S. total:

WDRCPUS = ΣWDRCPZZ

British Thermal Units (Btu)

The residential sector data in cords are converted to Btu by using the conversion factor of 20 million Btu per cord:

WDRCBZZ = WDRCPZZ * 20
WDRCBUS = ΣWDRCBZZ

Data Sources

WDRCPZZ — Wood energy consumed by the residential sector by State.

- 1960 through 1979: EIA, *Estimates of U.S. Wood Consumption from 1949 to 1981*, Table A4. Data published in thousand short tons are converted to thousand cords by using the factors of one short ton equals 17.2 million Btu (as published in the footnote of Table A4) and 20 million Btu equal one cord of wood, (as published in EIA, *Household Energy Consumption and Expenditures 1993*, page 314.
- 1980 forward: U.S. totals published in the EIA *Annual Energy Review,* Table 10.2a are converted from trillion Btu to thousand cords (by using the factor of 20 million Btu per cord) and allocated to the States as described below. Hawaii residential wood consumption is assumed to be zero for all years.
  - — 1980 through 1983: U.S. Census Region wood consumption in thousand cords from Form EIA-457, "1981 Residential Energy Consumption Survey" is allocated to the States within each Region in proportion to the U.S. Department of Commerce, Bureau of the Census, *American Housing Survey*, "Total Housing Units for States, July 1, 1981." This derived 1981 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 1980 through 1983.
  - — 1984 through 1986: U.S. Census division wood consumption in thousand cords from Form EIA-457, "1984 Residential Energy Consumption Survey" is allocated to the States within each

Division in proportion to the U.S. Department of Commerce, Bureau of the Census, *American Housing Survey*, "Total Housing Units for States, July 1, 1984." This derived 1984 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 1984 through 1986.

— 1987 through 1989: U.S. Census division wood consumption in thousand cords from Form EIA-457, "1987 Residential Energy Consumption Survey" is allocated to the States within each Division in proportion to the U.S. Department of Commerce, Bureau of the Census, *American Housing Survey*, "Total Housing Units for States, July 1, 1987." This derived 1987 series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 1987 through 1989.

— 1990 through 1992: U.S. Census division wood consumption in thousand cords are from Form EIA-457, "1990 Residential Energy Consumption Survey." State-level estimates are available for 1993 for California, Florida, New York, and Texas from the Form EIA-457, "1993 Residential Energy Consumption Survey." Those four States' percentages of their respective Division totals in the 1993 survey are applied to the 1990 Census division data to derive their 1990 values. Wood consumption by the other States in each Division is estimated by allocating the remaining Division data to the States in proportion to the U.S. Department of Commerce, Bureau of the Census, Internet file (ST-98-51) "Estimates of Housing Units,...Annual Time Series,...(includes revised April 1, 1990 census housing...)" column titled "4/1/90 Census" at http://www.census.gov/population/estimates/housing/sthuhh6.txt. This derived 1990 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 1990 through 1992.

— 1993 through 1996: Residential wood consumption data for U.S. Census divisions and for California, Florida, New York, and Texas are from Form EIA-457, "1993 Residential Energy Consumption Survey." Data for the other States in each Division are estimated by allocating the remaining Division data to the States in proportion to the U.S. Department of Commerce, Bureau of the Census, Internet file (ST-98-51) "Estimates of Housing Units,...Annual Time Series, July 1, 1991 to July 1, 1998...," column titled "7/1/93" at http://www.census.gov/population/estimates/housing/sthuhh6.txt. This derived 1993 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 1993 through 1996.

— 1997 through 2000: Residential wood consumption data for U.S. Census divisions and for California, Florida, New York, and Texas are from Form EIA-457, "1997 Residential Energy Consumption Survey." Data for the other States in each Division are estimated by allocating the remaining Division data to the States in proportion to the U.S. Department of Commerce, Bureau of the Census, Internet file (ST-98-51) "Estimates of Housing Units,...Annual Time Series, July 1, 1991 to July 1, 1998...," column titled "7/1/97" at http://www.census.gov/population/estimates/housing/sthuhh6.txt. This derived 1997 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 1997 through 2000.

— 2001 through 2004: Residential wood consumption data for U.S. Census divisions and for California, Florida, New York, and Texas are from Form EIA-457, "2001 Residential Energy Consumption Survey." Data for the other States in each Division are estimated by allocating the remaining Division data to the States in proportion to the U.S. Department of Commerce, Bureau of the Census, Internet file "Table 1. Annual Estimates of Housing Units for the United States and States: April 1, 2000 to July 1, 2007," column titled "July 1, 2001" at http://www.census.gov/popest/housing/tables/HU-EST2007-01.xls. This derived 2001 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 2001 through 2004.

— 2005 forward: Residential wood consumption data for U.S. Census divisions and for California, Florida, New York, and Texas are from Form EIA-457, "2005 Residential Energy Consumption Survey." Data for the other States in each Division are estimated by allocating the remaining Division data to the States in proportion to the U.S. Department of Commerce, Bureau of the Census, Internet file "Table 1. Annual Estimates of Housing Units for the United States and States: April 1, 2000 to July 1, 2008," column titled "July 1, 2005" at http://www.census.gov/popest/housing/tables/HU-EST2008-01.xls. This derived 2005 State series is used to allocate the *AER* annual U.S. residential wood consumption to the States for 2005 forward.

Commercial Sector

Estimates of wood consumed in the commercial sector by State for 1960 through 1979 are from the EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*. The data published in thousand short tons are converted to billion Btu by using the conversion factor of one short ton equals 17.2 million Btu. The assumption was made in that report that wood is consumed in the commercial sector in proportion to consumption in the residential sector each year. For 1980 through 1988, national level commercial wood consumption estimates in trillion Btu are from the EIA, *Annual Energy Review*. Using the same methodology as for previous years, the national data are allocated to the States in proportion to residential sector wood use each year.

For 1989 forward, State-level data on wood and waste consumption by commercial combined-heat-and-power (CHP) and electricity-only plants are available from the EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. The U.S. total wood consumption in the commercial sector is published in the *AER*. The U.S. total of the State commercial CHP and electricity-only plant wood consumption is subtracted from the *AER* national commercial sector total, and the remainder is allocated to the States in proportion to each State's residential sector wood use each year from 1989 forward.

The data series described above, used to estimate SEDS wood and waste consumption in the commercial sector, are identified as follows ("ZZ" in the variable names represents the two-letter State code that differs for each State):

WDRCPZZ = wood consumed in the residential sector of each State, in thousand cords;
WDCCBUS = wood consumed by the commercial sector in the United States, in billion Btu;
WDC3BZZ = wood consumed by CHP and electricity-only facilities in the commercial sector of each State, in billion Btu; and
WSC3BZZ = waste consumed by CHP and electricity-only facilities in the commercial sector of each State, in billion Btu.

The U.S. totals for the State-level series are calculated as the sum of the State data.

WDRCPUS = ΣWDRCPZZ
WDC3BUS = ΣWDC3BZZ
WSC3BUS = ΣWSC3BZZ

The national total wood consumed by commercial entities other than CHP and electricity-only facilities are calculated as shown below, and those volumes are allocated to the States in proportion to the residential wood consumption series as follows:

WDC4BUS = WDCCBUS – WDC3BUS
WDC4BZZ = (WDRCPZZ / WDRCPUS) * WDC4BUS

State totals of commercial wood consumption is calculated as the sum of consumption by CHP and electricity-only facilities and the remaining commercial sector:

WDCCBZZ = WDC3BZZ + WDC4BZZ

Total commercial consumption of waste is set equal to the commercial consumption of waste by CHP and electricity-only facilities, which are the only commercial facilities with waste consumption, and the U.S. total is calculated as the sum of the State values.

WSCCBZZ = WSC3BZZ
WSCCBUS = ΣWSCCBZZ

The total wood and waste consumption in the commercial sector is calculated as the sum of wood consumption and waste consumption, and the U.S. total is calculated as the sum of the State data:

WWCCBZZ = WDCCBZZ + WSCCBZZ
WWCCBUS = ΣWWCCBZZ

Data Sources

WDC3BZZ — Wood energy consumed by CHP and electricity-only facilities in the commercial sector of each State.

- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

WDCCBUS — Wood consumed by the commercial sector in the United States.

- 1960 through 1979: EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A7. Data published in thousand short tons are converted to Btu using the factor of one short ton equals 17.2 million Btu (as stated in the footnote of Table A7).
- 1980 forward: EIA, data in billion Btu shown in trillion Btu in the *Annual Energy Review 2009*, Table 10.2a.

WSC3BZZ — Waste energy consumed by CHP and electricity-only facilities in the commercial sector of each State.

- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

WDRCPZZ — Wood energy consumed by the residential sector by State.

See sources on page 92.

Industrial Sector

Industrial sector wood and waste consumption estimates by State for 1960 through 1979 are from the EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*. The data, published in thousand short tons, are converted to billion Btu using the factor 1 short ton equals 17.2 million Btu.

Estimates for 1980 through 1995 are based on a national-level data series published for 1949 forward in the EIA *Annual Energy Review (AER)*. National wood and waste consumption by type is collected by Standard Industrial Classification (SIC) on the EIA triennial survey Form EIA-846, "Manufacturing Energy Consumption Survey" (MECS) for 1985, 1988, 1991, and 1994. The assumption is made that wood and waste use in the manufacturing sector occurs primarily in the industries included in SIC series 2421 (sawmills and planing mills), 2511 (wood household furniture), 2621 (paper mills), 2046 (wet corn milling), and 2061 (raw cane sugar). The amount of wood and waste consumed by each of the SIC groups of industries is estimated from the MECS data, and the MECS proportions are used to allocate the U.S. totals from the *AER* to SIC groups for each year. The SIC annual subtotals are allocated to the States using State-level data on the value added in manufacturing processes for each of the SIC series listed above, as published in the U.S. Department of Commerce, Bureau of the Census, *Census of Manufactures, Industry Series*, for 1982, 1987, and 1992.

Estimates for 1996 forward use the same methodology used for 1980 through 1995 with the exception that the Bureau of the Census *Economic Census* for 1997 and 2002 use North American Industry Classification System (NAICS) instead of Standard Industrial Classifications. Some categories used in the two classification systems are directly comparable (NAICS 311221 to SIC 2046, NAICS 311311 to SIC 2061, and NAICS 322130 to SIC 2631), some are closely (over 97 percent) comparable (NAICS 337122 to SIC 2511 and the sum of NAICS 321113 and 321912 to SIC 2421), and one is roughly (74 percent) comparable (NAICS 322121 to SIC 2621). The EIA survey Form EIA-846, MECS, also uses NAICS codes in the surveys for 1998, 2002, and 2006. The discontinuity in these State allocating series caused by the change from SIC to NAICS categories is not significant in light of the broad assumptions of the estimation methodology.

For 1989 forward, State-level data on wood and waste consumption by industrial combined heat and power (CHP) and electricity-only facilities are available from the EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms. These data are used with the manufacturing data to estimate total industrial sector wood and waste consumption for each State.

Industrial wood and waste consumption is expressed in Btu because its components are physically measured in a variety of units (e.g., tons, cubic feet, and kilowatthours). Industrial wood and waste data series are identified in SEDS by the following names ("ZZ" in the variable name represents the two-letter State code that differs for each State):

WDI3BZZ = wood consumed by CHP and electricity-only facilities in the industrial sector in each State, in billion Btu;
WDI4BZZ = wood consumed by the manufacturing portion of the industrial sector of each State, in billion Btu;
WSI3BZZ = waste consumed by CHP and electricity-only facilities in the industrial sector in each State, in billion Btu; and
WSI4BZZ = waste consumed by the manufacturing portion of the industrial sector of each State, in billion Btu.

The U.S. totals of the State series are calculated as the sum of the State data:

WDI3BUS = ΣWDI3BZZ
WDI4BUS = ΣWDI4BZZ
WSI3BUS = ΣWSI3BZZ
WSI4BUS = ΣWSI4BZZ

The U.S. total for wood consumed by the industrial sector is calculated as the sum of consumption by CHP and electricity-only facilities and the manufacturing sector, and the U.S. total is calculated as the sum of the State data:

WDICBZZ = WDI3BZZ + WDI4BZZ
WDICBUS = ΣWDICBZZ

The U.S. total for waste consumed by the industrial sector is calculated as the sum of consumption by CHP and electricity-only facilities and the manufacturing sector, and the U.S. total is calculated as the sum of the State data:

WSICBZZ = WSI3BZZ + WSI4BZZ
WSICBUS = ΣWSICBZZ

The total manufacturing sector is calculated as the sum of wood consumption and the sum of waste consumption, and the U.S. total is calculated as the sum of the State data:

WWI4BZZ = WDI4BZZ + WSI4BZZ
WWI4BUS = ΣWWI4BZZ

The total industrial sector is calculated as the sum of wood consumption and the sum of waste consumption, and the U.S. total is calculated as the sum of the State data:

WWICBZZ = WDICBZZ + WSICBZZ
WWICBUS = ΣWWICBZZ

Data Sources

WDI3BZZ — Wood consumed by CHP and electricity-only facilities in the industrial sector by State.

- 1960 through 1988: No data available. Values are assumed to be zero.
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms.

WDI4BZZ — Wood consumed by the manufacturing sector by State.

- 1960 through 1979: EIA, *Estimates of U.S. Wood Energy Consumption from 1949 to 1981*, Table A10. Data published in thousand short tons are converted to Btu by using the factor of one short ton equals 17.2 million Btu (as published in the footnote of Table A10).
- 1980 forward: EIA estimates developed by using three data sources. U.S. totals for each year are as published for selected years in the EIA, *Annual Energy Review (AER)*, Table 10.2b.
  - 1980 through 1985: U.S. totals from the *AER* are allocated to Standard Industrial Classification (SIC) groups 20, 24, 25, and 26 based on data from the Form EIA-846, "Manufacturing Energy Consumption Survey 1985," Table 3, Columns "Major Byproducts" and "Other." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1982 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2511 Wood Household Furniture, Industry 2621 Paper Mills, and Industry 2631 Paperboard Mills. The State values for each of the four SIC groups are summed to derive State total wood and waste industrial consumption estimates.
  - 1986 through 1989: U.S. totals from the *AER* are allocated to SIC groups 20, 24, 25, and 26 based on data from the Form EIA-846, "Manufacturing Energy Consumption Survey 1988," Tables 2 and 18, columns "Pulping Liquor," "Roundwood," and "Wood Chips." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1987 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2511 Wood Household Furniture, Industry 2621 Paper Mills, and Industry 2631 Paperboard Mills. The State values for each of the four SIC groups are summed to derive State total industrial wood consumption estimates.
    For 1989 only, State-level data on wood consumption by combined heat and power (CHP) and electricity-only facilities are

available from the Form EIA-867, "Annual Nonutility Power Producer Report" in billion Btu. These CHP and electricity-only State data are summed and subtracted from the *AER* U.S. total. The remaining value is assumed to be the manufacturing sector and is allocated to the States using the method above. The State values for each of the four SIC groups and the CHP and electricity-only facilities are summed to derive State total industrial wood consumption estimates.

— 1990 through 1993: State-level data on wood consumption by CHP and electricity-only facilities from the Form EIA-867, "Annual Nonutility Power Producer Report" in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to SIC groups 20, 24, 25, and 26 based on unpublished data on pulping liquor, roundwood, and wood chips from the Form EIA-846, "Manufacturing Energy Consumption Survey 1991 (MECS)." SIC groups 20 and 26 are grouped as "Other" in MECS. The proportions of those two groups in the 1988 and 1994 MECS are averaged and used to estimate the breakout for 1991. These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1992 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2541 Wood Partitions and Fixtures, and Industry 2621 Paper Mills. The State values for each of the four SIC groups and the CHP and electricity-only facilities are summed to derive State total industrial wood consumption estimates.

— 1994 and 1995: State-level data on wood consumption by CHP and electricity-only facilities from the Form EIA-867, "Annual Nonutility Power Producer Report" in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to SIC groups 20, 24, 25, 26, and "Other" based on data from the Form EIA-846, "1994 Manufacturing Energy Consumption Survey," Table A7, columns "Pulping or Black Liquor," "Wood from Trees," and "Wood from Mills." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1992 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2511 Wood Household Furniture, Industry 2621 Paper Mills, and Industry 2631 Paperboard Mills. The State values for each of the five SIC groups and the CHP and electricity-only facilities are summed to derive State total industrial wood consumption estimates.

— 1996 and 1997: State-level data on wood consumption by CHP and electricity-only facilities from the Form EIA-867, "Annual Nonutility Power Producer Report," in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to SIC groups 20, 24, 25, 26, and "Other" based on data from the Form EIA-846, "1994 Manufacturing Energy Consumption Survey," Table A7, columns "Pulping or Black Liquor," "Wood from Trees," and "Wood from Mills." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1997 Economic Census.* In the *Economic Census* the SIC groupings for the State data are replaced by North American Industry Classification System (NAICS) industry groups. The two industry classification systems are not identical, but NAICS groups are chosen that compare with SIC categories as closely as possible. The State series are from Table 2, column titled "Value Added by Manufacturer," from the publications for NAICS Industry 311221 Wet corn milling (for SIC 20 Food), Industry 321113 Sawmills and Industry 3212 Engineered wood product manufacturing (for SIC 24 Wood), Industry 3372 Office furniture manufacturing (for SIC 25 Furniture), Industry 322121 Paper mills, and Industry 322130 Paperboard mills (for SIC 26 Paper), and Industry 313 Textile mills (for Other SIC). The State values for each of the five NAICS group subtotals and the CHP and electricity-only facilities are summed to derive State total industrial wood consumption estimates.

— 1998 forward: State-level data on wood consumption by CHP and electricity-only facilities from the Form EIA-923, "Power Plant Operations Report," and predecessor forms, in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to NAICS industry groups 311, 321, 322, 337, and "Other" based on data from the Form EIA-846, "Manufacturing Energy Consumption Survey," 1998 (for 1998–2001), 2002 (for 2002–2005), and 2006 (for 2006 forward), table entitled "Selected Wood and Wood-Related Products in Fuel Consumption," columns "Pulping or Black Liquor,"

"Wood from Trees," and "Wood from Mills." These NAICS subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *Economic Census* for 1997 (1998–2000) and 2002 (2001 forward). The State series are from Table 2, column titled "Value Added by Manufacturer," from the publications for NAICS Industry 311221 Wet corn milling (for NAICS 311 Food), Industry 321113 Sawmills and Industry 3212 Engineered wood product manufacturing (for NAICS 321 Wood products), Industry 3372 Office furniture manufacturing (for NAICS 337 Furniture), Industry 322121 Paper mills, and Industry 322130 Paperboard mills (for NAICS 322 Paper), and Industry 313 Textile mills (for Other NAICS). The State values for each of the five NAICS group subtotals and the CHP and electricity-only facilities are summed to derive State total industrial wood consumption estimates.

WSI3BZZ — Waste consumed by CHP and electricity-only facilities in the industrial sector by State.

- 1960 through 1988: No data available. Values are assumed to be zero.
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

WSI4BZZ — Waste consumed by the manufacturing sector by State.

- 1960 through 1980: No data available. Values assumed to be zero.
- 1981 forward: EIA estimates developed by using three data sources. U.S. totals for each year are as published for selected years in the EIA, *Annual Energy Review 2008 (AER)*, Table 10.2b.
  - — 1981 through 1985: U.S. totals from the *AER* are allocated to Standard Industrial Classifications (SIC) groups 20, 24, 25, and 26 based on data from the EIA "Manufacturing Energy Consumption Survey 1985 (MECS)," Table 3, columns "Major By-products" and "Other." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1982 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2511 Wood Household Furniture, Industry 2621 Paper Mills, and Industry 2631 Paperboard Mills. The State values for each of the four SIC groups are summed to derive State total industrial waste consumption estimates.
  - — 1986 through 1989: U.S. totals from the *AER* are allocated to SIC groups 20, 24, 25, and 26 based on data from the Form EIA-846, "Manufacturing Energy Consumption Survey 1988," Tables 2 and 18, columns "Waste," and "Biomass." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1987 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2511 Wood Household Furniture, Industry 2621 Paper Mills, and Industry 2631 Paperboard Mills. The State values for each of the four SIC groups are summed to derive State total industrial waste consumption estimates.
    For 1989 only, State-level data on waste consumption by CHP and electricity-only facilities are available from the Form EIA-867, "Annual Nonutility Power Producer Report" in billion Btu. These CHP and electricity-only State data are summed and subtracted from the *AER* U.S. total. The remaining value is assumed to be the manufacturing sector and is allocated to the States using the method above. The State values for each of the four SIC groups and the CHP and electricity-only facilities are summed to derive State total industrial waste consumption estimates.
  - — 1990 through 1993: State-level data on waste consumption by CHP and electricity-only facilities from the Form EIA-867, "Annual Nonutility Power Producer Report" in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to SIC groups 20, 24, 25, and 26 based on unpublished data on waste and biomass from the Form EIA-846, "Manufacturing Energy Consumption Survey 1991 (MECS)." SIC groups 20 and 26 are grouped as "Other" in MECS 1991. The proportions of those two groups in the 1988 and 1994 MECS are averaged and used to estimate the breakout for 1991. These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1992 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for

Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2541 Wood Partitions and Fixtures, and Industry 2621 Paper Mills. The State values for each of the four SIC groups and the CHP and electricity-only facilities are summed to derive State total industrial waste consumption estimates.

— 1994 and 1995: State-level data on waste consumption by CHP and electricity-only facilities from the Form EIA-867, "Annual Nonutility Power Producer Report" in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to SIC groups 20, 24, 25, 26, and "Other" based on data from the Form EIA-846, "1994 Manufacturing Energy Consumption Survey," Table A7, columns "Agricultural Waste" and "Wood and Paper Refuse." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1992 Census of Manufactures,* Table 2, column titled "Value Added by Manufacturer," from the publications for Industry 2061 Raw Cane Sugar, Industry 2046 Wet Corn Milling, Industry 2421 Sawmills and Planing Mills, Industry 2511 Wood Household Furniture, Industry 2621 Paper Mills, and Industry 2631 Paperboard Mills. The State values for each of the five SIC groups and the CHP and electricity-only facilities are summed to derive State total industrial waste consumption estimates.

— 1996 and 1997: State-level data on waste consumption by CHP and electricity-only facilities from the Form EIA-867, "Annual Nonutility Power Producer Report" or Form EIA-860, "Annual Electric Generator Report" in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to SIC groups 20, 24, 25, 26, and "Other" based on data from the Form EIA-846, "1994 Manufacturing Energy Consumption Survey," Table A7, columns "Agricultural Waste" and "Wood and Paper Refuse." These SIC subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *1997 Economic Census*. In the *Economic Census* the SIC groupings for the State data are replaced by North American Industry Classification System (NAICS) industry groups. The two industry classification systems are not identical, but NAICS groups are chosen that compare with SIC categories as closely as possible. The State series are from Table 2, column titled "Value Added by Manufacturer," from the publications for NAICS Industry 311311 Sugar cane mills, and Industry 311221 Wet corn milling (for SIC 20 Food), Industry 321912 Cut stock, resawing lumber, and planing (for SIC 24 Wood), Industry 3372 Office furniture manufacturing (for SIC 25 Furniture), Industry 322122 Newsprint mills, and Industry 322130 Paperboard mills (for SIC 26 Paper), and Industry 313 Textile mills (for Other SIC). The State values for each of the five NAICS group subtotals and the CHP and electricity-only facilities are summed to derive State total industrial waste consumption estimates.

— 1998 forward: State-level data on waste consumption by CHP and electricity-only facilities from the Form EIA-923, "Power Plant Operations Report," and predecessor forms, in billion Btu are summed and subtracted from the *AER* U.S. total. The remaining national value is allocated to NAICS industry groups 311, 321, 337, and 322, and "Other" based on data from the Form EIA-846, "Manufacturing Energy Consumption Survey," 1998 (for 1998–2001), 2002 (for 2002–2005), and 2006 (for 2006 forward), Table A7, columns "Agricultural Waste" and "Wood and Paper Refuse." These NAICS subtotals are allocated to the States using State-level series from the U.S. Department of Commerce, Bureau of the Census, *Economic Census* for 1997 (1998–2000) and 2002 (2001 forward). The State series are from Table 2, column titled "Value Added by Manufacturer," from the publications for NAICS Industry 311311 Sugar cane mills, and Industry 311221 Wet corn milling (for SIC 20 Food), Industry 321912 Cut stock, resawing lumber, and planing (for SIC 24 Wood), Industry 3372 Office furniture manufacturing (for SIC 25 Furniture), Industry 322122 Newsprint mills, and Industry 322130 Paperboard mills (for SIC 26 Paper), and Industry 313 Textile mills (for Other SIC). The State values for each of the five NAICS group subtotals and the CHP and electricity-only facilities are summed to derive State total industrial waste consumption estimates.

Electric Power Sector

Electric power sector use of wood and waste to generate electricity is based on data series from EIA Form EIA-923, "Power Plant Operations Report," and predecessor forms and is estimated in SEDS using two

methods. From 1989 forward, the Btu content of the wood and waste consumed by electric power plants is reported on the data collection forms and used in SEDS. Prior to 1989, Btu data were not collected by the source data forms and data on electricity generation from wood and waste are used instead. Net generation of electricity is converted to equivalent Btu using the fossil-fueled steam-electric plant conversion factor, and the resulting Btu values are entered into SEDS. Rarely, power plants can use more electricity than they generate from wood and waste energy sources and a negative net generation (and, therefore, Btu consumption) value can be seen in SEDS. From 1960 through 1981, electricity generation from wood and waste are reported combined and from 1982 forward generation or Btu values from each source are reported separately.

The data series are identified in SEDS by the following names ("ZZ" in the variable name represents the two-letter State code that differs for each State):

WDEIBZZ = wood consumed by the electric power sector in each State (included in waste energy for 1960 through 1981), in million Btu; and
WSEIBZZ = waste consumed by the electric power sector in each State (includes wood energy for 1960 through 1981), in million Btu.

The U.S. totals are calculated as the sum of the State data, and wood and waste are summed to provide a total (WW) value:

WDEIBUS = ΣWDEIBZZ
WSEIBUS = ΣWSEIBZZ

WWEIBZZ = WDEIBZZ + WSEIBZZ
WWEIBUS = ΣWWEIBZZ

Data Sources

WDEIBZZ — Wood consumed by the electric power sector by State.

- 1960 through 1981: Data included in waste energy sources, see WSEIBZZ.
- 1982 through 1988: EIA, Form EIA-759, "Monthly Power Plant Report," electricity generation from wood converted to Btu using the fossil-fueled steam-electric power plant conversion factor shown in Table B1 (http://www.eia.gov/emeu/states/_seds_tech_notes.html).
- 1989 forward: EIA Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

WSEIBZZ — Waste consumed by the electric power sector by State.

- 1960 through 1988: EIA, Form EIA-759, "Monthly Power Plant Report," and predecessor forms, electricity generation from waste (includes wood energy sources from 1960 through 1981) converted to Btu using the fossil-fueled steam-electric power plant conversion factor shown in Table B1 (http://www.eia.gov/emeu/states/_seds_tech_notes.html).
- 1989 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

Totals

State total consumption of wood and waste is calculated as the sum of the consumption in the residential, commercial, and industrial sectors as well as consumption by the electric power sector. The U.S. total is the sum of the State data:

WDTCBZZ = WDRCBZZ + WDCCBZZ + WDICBZZ + WDEIBZZ
WDTCBUS = ΣWDTCBZZ

WSTCBZZ = WSCCBZZ + WSICBZZ + WSEIBZZ
WSTCBUS = ΣWSTCBZZ

WWTCBZZ = WDTCBZZ + WSTCBZZ
WWTCBUS = ΣWWTCBZZ

Additional Calculations

Additional calculations are made in SEDS to aggregate some data series to be shown in the tables of this report. Wood and biomass waste, fuel ethanol, and losses and co-products generated during the production of fuel

ethanol were combined to be shown under "biomass" in the summary tables titled "Energy Consumption Estimates by Source" as follows:

BMTCB = WWTCB + ENTCB + ENLCB

Renewable Energy Total

Renewable energy subtotals for each consuming sector in billion Btu are calculated for each State and the U.S. totals. In addition, the industrial sector includes energy losses and co-products from the production of fuel ethanol (ENLCB).

RERCB = GERCB + SOHCB + WDRCB
RECCB = ENCCB + GECCB +HYCCB + WWCCB
REICB = ENICB + ENLCB + GEICB + HYICB + WWICB
REACB = ENACB

REEIB = GEEGB + HYEGB + SOEGB + WWEIB + WYEGB

RETCB = RERCB + RECCB + REICB + REACB + REEIB

In the calculations of all aggregated series, data for any component series that are not available in the earlier years are assumed to be zero.

Section 6. Electricity

This section describes electrical energy sources; electricity consumed by end users (i.e., electricity sold to end users); estimates of the electrical system energy losses incurred in the generation, transmission, and distribution of electricity; and estimates of net interstate sales of electricity.

Electrical Energy Sources

Physical Units

Electricity is produced from a number of energy sources. In the State Energy Data System (SEDS), coal, natural gas, and petroleum are measured in physical units of thousand short tons, million cubic feet, and thousand barrels, respectively, as they are consumed by the electric power sector. Since wood and waste are measured in a variety of physical units, they are converted to the equivalent heat content and entered into SEDS measured in British thermal units. Because comparable measures in physical units for nuclear power, hydroelectric, wood, waste, geothermal, wind, photovoltaic, and solar thermal energy sources are not available, energy output in the form of electricity produced from these energy sources, in million kilowatthours, is used instead. The variable names for these data are as follows ("ZZ" in the variable name represents the two-letter State code that differs for each State):

CLEIPZZ = coal consumed by the electric power sector (described in Section 2 of this report), in thousand short tons;
ELEXPZZ = electricity exported from the United States, in million kilowatthours;
ELIMPZZ = electricity imported into the United States, in million kilowatthours;
GEEGPZZ = electricity produced from geothermal energy by the electric power sector (described in Section 5), in million kilowatthours;
HYEGPZZ = electricity produced from hydroelectric power in the electric power sector (described in Section 5), in million kilowatthours;
NGEIPZZ = natural gas consumed by the electric power sector (described in Section 3), in million cubic feet;
NUEGPZZ = electricity produced from nuclear power in the electric power sector, in million kilowatthours;
PAEIPZZ = petroleum consumed by the electric power sector (described in Section 4), in thousand barrels;
SOEGPZZ = electricity produced from photovoltaic and solar thermal energy sources in the electric power sector (described in Section 5), in million kilwatthours;
WDEIBZZ = wood energy sources consumed by the electric power sector (described in Section 5), in billion Btu;
WSEIBZZ = waste energy sources consumed by the electric power sector (described in Section 5), in billion Btu; and
WYEGPZZ = electricity produced from wind energy by the electric power sector (described in Section 5), in million kilowatthours.

The U.S. totals for these series are calculated as the sum of the State data.

British Thermal Units (Btu)

In order to total all the energy that is used to produce electricity, the energy sources are converted to the common unit of Btu. The methods for calculating the Btu content of coal, natural gas, petroleum, and renewable energy sources consumed for generating electric power are explained in their respective sections of this documentation. Nuclear electric power is described in the following section.

Total energy consumed by the electric power sector is the sum of all primary energy used to generate electricity, including net imports of electricity across U.S. borders (ELNIBZZ, see page 105). To eliminate the double counting of supplemental gaseous fuels, which are accounted for in the fossil fuels from which they are derived, and in natural gas, they are removed from the total:

TEEIBZZ = CLEIBZZ + NGEIBZZ + PAEIBZZ + NUEGBZZ + GEEGBZZ + HYEGBZZ + SOEGBZZ + WWEIBZZ + WYEGBZZ + ELNIBZZ - SFEIBZZ
TEEIBUS = ΣTEEIBZZ

Nuclear Electric Power

Electricity generated from nuclear power, in million kilowatthours, by both regulated electric utilities and nonutility power producers are included in the State Energy Data System (SEDS) electric power sector. In the following formulas, "ZZ" in the variable name represents the two-letter State code that differs for each State:

NUEGPZZ = electricity produced from nuclear power in the electric power sector, in million kilowatthours.

The U.S. total is calculated as the sum of the State data:

NUEGPUS = ΣNUEGPZZ

Nuclear power used for generating electricity is the total nuclear energy, NUETP, included in EIA consumption data:

NUETPZZ = NUEGPZZ
NUETPUS = NUEGPUS

The factor for converting electricity produced from nuclear energy (NUETKUS) is developed from data collected from nuclear steam-electric power plants. These U.S. average factors, which vary from year to year, can be found in Appendix B, Table B1, http://www.eia.gov/emeu/states/_seds_updates_tech_notes.html.

NUETKUS = factor for converting nuclear electricity from kilowatthours to Btu.

The formulas for applying the nuclear factor are:

NUEGBZZ = NUEGPZZ * NUETKUS
NUEGBUS = ΣNUEGBZZ

NUETBZZ = NUEGBZZ
NUETBUS = NUEGBUS

Data Sources

NUEGPZZ — Electricity produced from nuclear power in the electric power sector by State.

- 1960 through 1977: Federal Power Commission, News Release, "Power Production, Fuel Consumption, and Installed Capacity Data," table titled "Net Generation of Electric Utilities by State and Source."
- 1978 through 1980: U.S. Energy Information Administration (EIA), *Energy Data Reports*, "Power Production, Fuel Consumption and Installed Capacity Data," table titled "Net Generation of Electric Utilities by State and Source" (1978) and Table 36 (1979 and 1980).
- 1981 through 1985: EIA, Form EIA-759, "Monthly Power Plant Report," and predecessor forms. Data are published in the EIA, *Electric Power Annual 1985*, Table 6.
- 1986 forward: EIA, Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

NUETKUS — Factor for converting electricity produced from nuclear power from physical units to Btu.

- 1960 through 1984: Calculated annually by the EIA by dividing the total heat content consumed in reactors at nuclear plants by the total (net) electricity generated by nuclear plants. The heat content and electricity generation are reported on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others" and Form EIA-412, "Annual Report of Public Electric Utilities," and predecessor forms. The factors for 1982 through 1984 are published in the following:

— 1982: EIA, *Historical Plant Cost and Annual Production Expenses for Selected Electric Plants 1982*, page 215.
— 1983 and 1984: EIA, *Electric Plant Cost and Power Production Expenses 1991*, Table 13.

- 1985 forward: Calculated annually by EIA using the heat rate reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms), and the generation reported on Form EIA-923, "Power Plant Operations Report" (and predecessor forms).

Electricity Imports and Exports

Electricity transmitted across U.S. borders with Canada and Mexico are included in the State Energy Data System (SEDS) electric power sector.

ELEXPZZ = electricity exported from the United States by State, in million kilowatthours;
ELIMPZZ = electricity imported into the United States by State, in million kilowatthours;

U.S. totals are calculated as the sum of the State data:

ELIMPUS = ΣELIMPZZ
ELEXPUS = ΣELEXPZZ

Net imports are derived by subtracting exports of electricity from imports:

ELNIPZZ = ELIMPZZ – ELEXPZZ
ELNIPUS = ΣELNIPZZ

Imports and exports of electricity in million kilowatthours are converted to billion Btu by multiplying the physical unit data by the conversion factor of 3.412 thousand Btu per kilowatthour.

ELIMBZZ = ELIMPZZ * 3.412
ELIMBUS = ΣELIMBZZ
ELEXBZZ = ELEXPZZ * 3.412
ELEXBUS = ΣELEXBZZ

ELNIBZZ = ELIMBZZ – ELEXBZZ

ELNIBUS = ΣELNIBZZ

Data Sources

ELEXPZZ — Electricity exported from the United States (assumed to be produced by hydroelectric power through 1988) by State.

- 1960 through 1981: Economic Regulatory Administration, *Staff Reports*, "Report on Electric Energy Exchanges with Canada and Mexico." Source data are arranged by the Regional Reliability Council Areas and then by the electric utility. State data were tabulated by aggregating the data of all electric utilities within each State.
- 1982 and 1983: U.S. Energy Information Administration (EIA) State estimates are based on data from Economic Regulatory Administration Form ERA-781R, "Annual Report of Electrical Export/Import Data." State estimates are consistent with national and regional totals published in the ERA, *Electricity Exchanges Across International Borders*.
- 1984 through 1987: EIA State estimates are based on data from Economic Regulatory Administration Form ERA-781R, "Annual Report of Electrical Export/Import Data," the Federal Energy Regulatory Commission Form 1, and the Bonneville Power Administration Annual Report. State estimates are consistent with national and regional totals published in the ERA, *Electricity Transactions Across International Borders*.
- 1988 forward: EIA State estimates are based on data from DOE, Office of Electricity Delivery and Energy Reliability, OE-781R, "Annual Report of International Electric Export/Import Data," and predecessor forms, and the Canada National Energy Board report, "Electricity Exports and Imports, Monthly Statistics for December...."

ELIMPZZ — Electricity imported into the United States (assumed to be produced by hydroelectric power through 1988) by State.

- 1960 through 1981: Economic Regulatory Administration, *Staff Reports*, "Report on Electric Energy Exchanges with Canada and Mexico." Source data are arranged by the Regional Reliability Council Areas and then by the electric utility. State data were tabulated by aggregating the data of all electric utilities within each State.

- 1982 and 1983: EIA State estimates are based on data from Economic Regulatory Administration Form ERA-781R, "Annual Report of Electrical Export/Import Data." State estimates are consistent with national and regional totals published in the ERA, *Electricity Exchanges Across International Borders*.
- 1984 through 1987: EIA State estimates are based on data from Economic Regulatory Administration Form ERA-781R, "Annual Report of Electrical Export/Import Data," the Federal Energy Regulatory Commission Form 1, and the Bonneville Power Administration Annual Report. State estimates are consistent with national and regional totals published in the ERA, *Electricity Transactions Across International Borders*.
- 1988 forward: EIA State estimates are based on data from DOE, Office of Electricity Delivery and Energy Reliability, OE-781R, "Annual Report of International Electric Export/Import Data," and predecessor forms, and the Canada National Energy Board report, "Electricity Exports and Imports, Monthly Statistics for December...."

Electricity Consumed by the End User

Physical Units

The amount of electricity sold to end users is considered to be the amount of electricity consumed by the end-use sectors. Six electricity sales data series, in physical units of million kilowatthours, are used to estimate consumption of electricity by end-use sector. The variable names for these data are as follows ("ZZ" in the variable name represents the two-letter State code that differs for each State):

ESRCPZZ = electricity sold to the residential sector;
ESCMPZZ = a portion of the electricity sold to the commercial sector;
ESICPZZ = electricity sold to the industrial sector;
ESACPZZ = electricity sold to the transportation sector (2003 forward);
ESOTPZZ = electricity sold to "Other" users (i.e., public street and highway lighting, other public authorities, railroads and railways, and interdepartmental sales) (1960 through 2002); and
ESTRPZZ = electricity consumed by transit systems (1960 through 2002).

U.S. totals for the six State-level series are calculated as the sum of the State data.

Sales of electricity to the residential and industrial sectors contained in the U.S. Energy Information Administration (EIA) *Electric Sales and Revenues* database are used directly as consumption of electricity by these sectors.

Beginning in 2003, sales of electricity to the commercial sector contained in the *Electric Sales and Revenues* database are used directly as consumption of electricity by this sector. Prior to 2003, commercial electricity consumption is estimated as the sum of sales to the commercial sector and the portion of sales to the "Other" sector that is not used for transportation:

ESCCPZZ = ESCMPZZ + ESOTPZZ – ESTRPZZ
ESCCPUS = ΣESCCPZZ

From 2003 forward, transportation electricity sales data are taken directly from the *Electric Sales and Revenues* database. From 1960 through 2002, consumption of electricity for transportation, ESACPZZ, is equal to the electricity consumed by transit systems, ESTRPZZ, from the U.S. Department of Transportation, Federal Transit Administration.

Total electricity consumed is represented by ESTCPZZ and is calculated by adding the four end-use sector estimates:

ESTCPZZ = ESRCPZZ + ESCCPZZ + ESICPZZ + ESACPZZ
ESTCPUS = ΣESTCPZZ

British Thermal Units (Btu)

Electricity consumption estimates are converted into Btu by applying a constant factor of 3.412 thousand Btu per kilowatthour as illustrated in the formulas:

ESRCBZZ = ESRCPZZ * 3.412
ESTCBZZ = ESTCPZZ * 3.412

U.S. totals for the Btu series are calculated as the sum of the State data.

Additional Calculations

Beginning in 2003, electricity sold for transportation use is available from the EIA *Electric Sales and Revenues* database. For years prior to 2003, additional calculations are performed in the State Energy Data System (SEDS) to provide data for the EIA *Monthly Energy Review* and *Annual Energy Review* to use in estimating transportation electricity use. The share of electricity sold to the "Other" category of consumers that is used for transportation is calculated:

ESTRSUS = ESTRPUS / ESOTPUS

Additional Notes on Electricity Sales

1. Beginning in 2003, the source for electricity consumed by the transportation sector is the EIA Form EIA-861, "Annual Electric Power Industry Report." This is the first year that electricity sales data are collected separately for the transportation sector (previously these volumes were included in Commercial and "Other"). Information from the National Transit Data (NTD) System is used to supplement the EIA data for States with missing or incomplete volumes. Specifically, some States with no transportation electricity consumption reported in Form EIA-861 have small volumes of electricity consumed for battery recharging or for propulsion reported in the NTD System. They include: Alabama, Arkansas (2004-2007), Iowa (2003-2005), Maine (2003-2006), Mississippi, Missouri (2003), Tennessee (2003), and Wisconsin. Transportation electricity used was under-reported in Ohio in 2003 and Oregon. The missing transit system data for these two States are obtained from the NTD System.

2. The source for the electricity sales data for 1960 through 1983 is the EIA Form EIA-826, "Electric Utility Company Monthly Statement," and predecessor forms. Electricity sales data for 1984 forward are from Form EIA-861, "Annual Electric Utility Report." At the national level, data from both forms correspond closely (within 3 percent) for all end-use sectors. However, differences in the number of survey respondents and the reporting of commercial and industrial sales caused inconsistencies between 1983 and 1984 data in those end-use sectors for some States. See EIA *Electric Power Annual, 1991,* DOE/EIA-0348(91), p. 130, and *An Assessment of the Quality of Selected EIA Data Series, Electric Power Data*, DOE/EIA-0292(87), pp. 17–28, for detailed discussions of the reporting differences.

3. For 1960 through 1983, electricity sales data for the District of Columbia and Maryland are combined on the survey forms. Estimates of separate sales for the District of Columbia and Maryland were created by using electricity sales data by end-use sector by communities from the FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others," filed by the Potomac Electric Power Company (PEPCO). PEPCO sales to the District of Columbia were assumed to be total electricity sales in the District of Columbia. Electricity sales to the District of Columbia reported by PEPCO on the FERC Form 1 were subtracted from the EIA-826 District of Columbia and Maryland aggregate figures to obtain estimates of Maryland electricity sales by sector. Beginning with 1981 data, electric utilities were no longer required to report sales to specific communities. Sales data for the District of Columbia for 1981 through 1983 were obtained directly from PEPCO's accounting department.

Data Sources

ESACPZZ — Electricity consumed by the transportation sector by State.

- 1960 through 2002: Equal to ESTRPZZ.
- 2003 forward: EIA, "Historical EPA Electric Sales and Revenue Spreadsheets", http://www.eia.gov/cneaf/electricity/epa/sales_state.xls, sector name "Total Electric Industry", column "Transportation Sales." Data from the U.S. Department of Transportation, National Transit Database, http://www.ntdprogram.gov/ntdprogram/data.htm, (click on "Data Tables") are used for the following States: Alabama, Arkansas, Iowa, Maine, Mississippi, Missouri, Ohio, Oregon, Tennessee, and Wisconsin. See Additional Note 1 on page 107.

ESCMPZZ — A portion of the electricity sold to the commercial sector by State.

Note: Data for Maryland and the District of Columbia were combined for 1960 through 1983. The method for disaggregating the data is explained in Additional Note 3 on page 107.

- 1960 through 1975: Federal Power Commission, *Electric Power Statistics*, "Sales of Electric Energy to Ultimate Consumers."

- 1976 through 1980: EIA, *Electric Power Annual* (November 1982), Table 125.
- 1981 through 1983: EIA, Form EIA-826, "Electric Utility Company Monthly Statement," and predecessor forms. Published data rounded to gigawatthours in EIA, *Electric Power Annual 1983*, Table 51.
- 1984 through 1986: EIA, Form EIA-861, "Annual Electric Utility Report." Unpublished data.
- 1987: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual 1988,* Table 19.
- 1988 and 1989: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual,* Table 27.
- 1990 forward: EIA, "Historical EPA Electric Sales and Revenue Spreadsheets", http://www.eia.gov/cneaf/electricity/epa/sales_state.xls, sector name "Total Electric Industry," column "Commercial Sales."

ESICPZZ — Electricity consumed by the industrial sector by State.
Note: Data for Maryland and the District of Columbia were combined for 1960 through 1983. The method for disaggregating the data is explained in Additional Note 3 on page 107.

- 1960 through 1975: Federal Power Commission, Electric Power Statistics, "Sales of Electric Energy to Ultimate Consumers."
- 1976 through 1980: EIA, *Electric Power Annual* (November 1982), Table 126.
- 1981 through 1983: EIA, Form EIA-826, "Electric Utility Company Monthly Statement," and predecessor forms. Published data rounded to gigawatthours in EIA, *Electric Power Annual 1983*, Table 51.
- 1984 through 1986: EIA, Form EIA-861, "Annual Electric Utility Report." Unpublished data.
- 1987: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual 1988*, Table 19.
- 1988 and 1989: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual,* Table 27.
- 1990 forward: EIA, "Historical EPA Electric Sales and Revenue Spreadsheets", http://www.eia.gov/cneaf/electricity/epa/sales_state.xls, sector name "Total Electric Industry," column "Industrial Sales."

ESOTPZZ — Electricity sold to the "Other" sector (i.e., public street and highway lighting, sales to other public authorities, railroads and railways, and interdepartmental sales) by State.

Note: Data for Maryland and the District of Columbia were combined for 1960 through 1983. The method for disaggregating the data is explained in Additional Note 3 on page 107.

- 1960 through 1975: Federal Power Commission, *Electric Power Statistics*, "Sales of Electric Energy to Ultimate Consumers."
- 1976 through 1980: EIA, *Electric Power Annual* (November 1982), Table 127.
- 1981 through 1983: EIA, Form EIA-826, "Electric Utility Company Monthly Statement," and predecessor forms. Published data rounded to gigawatthours in EIA, *Electric Power Annual 1983*, Table 51.
- 1984 through 1986: EIA, Form EIA-861, "Annual Electric Utility Report." Unpublished data.
- 1987: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual 1988*, Table 19.
- 1988 and 1989: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual,* Table 27.
- 1990 through 2002: EIA, "Historical EPA Electric Sales and Revenue Spreadsheets", http://www.eia.gov/cneaf/electricity/epa/sales_state.xls, sector name "Total Electric Industry," column "Other Sales."
- 2003 forward: Series discontinued. Values are zero.

ESRCPZZ — Electricity consumed by the residential sector by State.

Note: Data for Maryland and the District of Columbia were combined for 1960 through 1983. The method for disaggregating the data is explained in Additional Note 3 on page 107.

- 1960 through 1975: Federal Power Commission, *Electric Power Statistics*, "Sales of Electric Energy to Ultimate Consumers."
- 1976 through 1980: EIA, *Electric Power Annual* (November 1982), Table 124.
- 1981 through 1983: EIA, Form EIA-826, "Electric Utility Company Monthly Statement," and predecessor forms. Published data rounded to gigawatthours in EIA, *Electric Power Annual 1983*, Table 51.
- 1984 through 1986: EIA, Form EIA-861, "Annual Electric Utility Report." Unpublished data.
- 1987: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual 1988*, Table 19.
- 1988 and 1989: EIA, Form EIA-861, "Annual Electric Utility Report." Published in the EIA, *Electric Power Annual,* Table 27.

- 1990 forward: EIA, "Historical EPA Electric Sales and Revenue Spreadsheets", http://www.eia.gov/cneaf/electricity/epa/sales_state.xls, sector name "Total Electric Industry," column "Residential Sales."

ESTRPZZ — Electricity consumed by transit systems by State.

Notes: The transit system data include electricity used to operate commuter rail, rapid rail, streetcars or light rail, cable cars, trolley-buses, motorbuses, automated guideways, inclined plane railways, and aerial tramways. These data do not include electricity used by Amtrak. These data are available on a fiscal year basis (July 1 through June 30) for 1979 through 1982 and for calendar years 1983 forward. Some data for 1979 through 1983 were adjusted by EIA on the basis of an analysis of historical trends. Electricity consumption for the District of Columbia for 1976 through 2002 is partially apportioned to Maryland and Virginia on the basis of electricity consumption data from the Washington Metropolitan Area Transit Authority.

- 1960 through 1978: EIA estimates are based on data from:
  - — The American Public Transit Association (formerly the American Transit Association) annual operating reports.
  - — Pushkarev, Boris S. and others, *Urban Rail in America*. (Bloomington, IN: Indiana University Press, 1982.)
  - — U.S. Department of Transportation, *A Directory of Regularly Scheduled, Fixed Route, Local Public Transportation Service in Urbanized Areas Over 50,000 Population*, 1980 and 1981.
- 1979 through 1989: U.S. Department of Transportation, Urban Mass Transportation Administration, *National Urban Mass Transportation Statistics, Section 15 Annual Report*, table titled "Energy Consumption: Details by Transit System."
  - — 1979 and 1980: Table 2.13.1.
  - — 1981 and 1982: Table 3.13.1.
  - — 1983 through 1989: Table 3.12.
- 1990 through 2002: U.S. Department of Transportation, Federal Transit Administration, *Data Tables for the Section 15 Report Year*, http://www.ntdprogram.gov/ntdprogram, (click on "Access NTD Data" and then "Data Tables."):
  - — 1990: Table 2.12.
  - — 1991: Table 13.
  - — 1992 through 1997: Table 15.
  - — 1998: Table 16.
  - — 1999 through 2002: Table 17.
- 2003 forward: Series replaced by ESACPZZ. Values are zero.

Estimates of Electrical System Energy Losses

British Thermal Units (Btu)

Electrical system energy losses, identified by "LO," include all losses incurred in the generation, transmission, and distribution of electricity, including plant use and unaccounted for quantities. Total losses for the United States, LOTCBUS, is assumed to be the difference between the total of all energy consumed by the electric power sector (TEEIBUS) and the total electricity sold to end users (ESTCBUS). Total losses for the United States is calculated in billion Btu as follows:

LOTCBUS = TEEIBUS – ESTCBUS

Because Alaska and Hawaii have no exchanges of electricity with other States, their electrical system energy losses are estimated as the difference between the sum of all energy consumed by the State's electric power sector and the electricity sold within the State:

LOTCBAK = TEEIBAK – ESTCBAK
LOTCBHI = TEEIBHI – ESTCBHI

Individual State electrical system energy losses for the remaining States are estimated by a different method. The difference between each of the contiguous 48 States' (including the District of Columbia) TEEIB series and ESTCB is not only the losses but also any net interstate flow of electricity that may occur between States. In some cases these net interstate flows are substantial. Therefore, an effort is made to estimate separately each State's losses and net interstate flow. The methodology is to calculate the contiguous-48-State subtotal of losses and subtotal of sales; to create annual losses-to-sales ratios for the aggregate of the 48 States; and to apply the annual losses-to-sales ratios from the total 48 States to the individual 48 States' sales to estimate their losses.

The following steps are performed to complete the losses estimates. A subtotal of losses in the contiguous 48 States, LOTCB48, is created by subtracting the Alaska and Hawaii losses from the total United States' losses:

LOTCB48 = LOTCBUS – (LOTCBAK + LOTCBHI)

A similar subtotal of electricity sales in the 48 States only, ESTCB48, is calculated:

ESTCB48 = ESTCBUS – (ESTCBAK + ESTCBHI)

The losses-to-sales ratio for the contiguous 48 States only, ELLSS48, is calculated:

ELLSS48 = LOTCB48 / ESTCB48

Over the period covered in the State Energy Data System (SEDS), the ratio is fairly constant, with a slight downward trend. For 1960, the losses-to-sales ratio is 2.5; for 1961 through 1983 the ratio is around 2.4; for 1984 through the 1990s it fluctuates between 2.2 and 2.3; and for recent years the losses-to-sales ratio gradually move downward from 2.27 in 2000 to 2.15 in 2008.

The U.S. ratios are applied to each State's sales to the major end-use sectors and total sales (temporarily including Alaska, Hawaii, and the 48-State subtotal for processing convenience):

LORCBZZ = ESRCBZZ * ELLSS48
LOCCBZZ = ESCCBZZ * ELLSS48
LOICBZZ = ESICBZZ * ELLSS48
LOACBZZ = ESACBZZ * ELLSS48
LOTCBZZ = ESTCBZZ * ELLSS48

Alaska, Hawaii, and the contiguous 48-State subtotal are recalculated to their original estimates. The end-use losses for Alaska and Hawaii are created in proportion to each sector's share of the State's total electricity sales:

LOTCBAK = TEEIBAK – ESTCBAK
LOTCBHI = TEEIBHI – ESTCBHI
LOTCB48 = LOTCBUS – (LOTCBAK + LOTCBHI)

LORCBAK(HI) = (ESRCBAK(HI) / ESTCBAK(HI)) * LOTCBAK(HI)
LOCCBAK(HI) = (ESCCBAK(HI) / ESTCBAK(HI)) * LOTCBAK(HI)
LOICBAK(HI) = (ESICBAK(HI) / ESTCBAK(HI)) * LOTCBAK(HI)
LOACBAK(HI) = (ESACBAK(HI) / ESTCBAK(HI)) * LOTCBAK(HI)

Losses for the United States, including Alaska and Hawaii, are the sums of all the States' losses.

Net Interstate Flow of Electricity

British Thermal Units (Btu)

An estimate of the net interstate flow of electricity is calculated as the difference between the total electricity sales and attributed losses and the total energy consumption by the electric power sector within each State. The estimated net interstate flow of electricity (ELISB) for each State and the United States is calculated:

ELISBZZ = (ESTCBZZ + LOTCBZZ) – TEEIBZZ
ELISBUS = ΣELISBZZ

Positive net interstate flow for a State means that the amount consumed within the State (including attributed losses) is greater than the amount of energy consumed by the electric power sector in the State. That is, the State is using more electricity than it generates and, therefore, is a net buyer from other States.

A negative number indicates that the State's consumption by the electric power sector is greater than the requirements for electricity within its own borders, and, therefore, it is a net seller of electricity to other States.

Section 7. Total Energy

The preceding sections of this documentation describe how EIA arrives at State end-use consumption estimates by individual energy source in the State Energy Data System (SEDS). This section describes how all energy sources are added in Btu to create total energy consumption and end-use consumption estimates.

Total Energy Consumption

Total energy consumption by State is defined in SEDS as the sum of all energy sources consumed. The total includes all primary energy sources used directly by the energy-consuming sectors (residential, commercial, industrial, transportation, and electric power), as well as net interstate sales of electricity (ELISB) and net imports of electricity (ELNIB).

Energy sources can be categorized as renewable and non-renewable sources:

Non-Renewable Sources

Fossil fuels:

- coal (CL)
- net imports of coal coke (U.S. only)
- natural gas (NG) excluding supplemental gaseous fuels (SF) (NN = NG - SF)
- petroleum products (PA) excluding fuel ethanol blended into motor gasoline (EN) (PM = PA - EN)

Nuclear electric power (NU)

Renewable Sources

- fuel ethanol (EN)
- geothermal direct use energy and geothermal heat pumps (GE)
- conventional hydroelectric power (HY)
- solar thermal direct use energy, and photovoltaic electricity net generation (SO)
- electricity produced by wind (WY)
- wood and wood-derived fuels (WD)
- biomass waste (WS)

Total consumption of fossil fuels in billion Btu are calculated for each State and the United States as follows:

FFTCBZZ = CLTCBZZ + NNTCBZZ + PMTCBZZ
FFTCBUS = CLTCBUS + CCNIBUS + NNTCBUS + PMTCBUS

The definition and calculation of the total consumption of each fossil fuel energy source is explained in Sections 2 through 4. Renewable energy total consumption (RETCB) is described in Section 5, and nuclear electric power (NUETB) is described in Section 6.

Total energy consumption in billion Btu for each State and the United States is calculated as follows:

TETCBZZ = FFTCBZZ + NUETBZZ + RETCBZZ + ELNIBZZ + ELISBZZ

TETCBUS = FFTCBUS + NUETBUS + RETCBUS + ELNIBUS

Total Energy Consumption by End-Use

Total energy consumption for each of the four end-use sectors (residential, commercial, industrial, and transportation) is the sum of all energy sources consumed by the sector. Each sector total includes retail sales of electricity, which is produced from other primary energy sources, and electrical system energy losses, which are allocated to the end-use sectors based on electricity sales.

Energy sources are presented as they are consumed; that is, natural gas includes supplemental gaseous fuels that are commingled with the natural gas, and petroleum products include fuel ethanol that is blended into motor gasoline.

In general, total energy consumed by the four end-use sectors by State and for the United States as a whole include the following:

- coal (CL)
- natural gas (NG), which includes supplemental gaseous fuels
- all petroleum products (PA), which includes fuel ethanol blended into motor gasoline
- geothermal direct use energy and geothermal heat pumps (GE)
- conventional hydroelectric power (HY)
- solar thermal direct use energy and photovoltaic electricity net generation (SO)
- wood (WD)
- biomass waste (WS)
- electricity sales (ES)
- electrical system energy losses (LO)

Prior to 1993, motor gasoline data from the source do not include fuel ethanol, so fuel ethanol (EN) is added to the total consumption calculation from 1960 through 1992. (Fuel ethanol data before 1981 are not available and are assumed to be zero.)

To prevent double counting of supplemental gaseous fuels (SF), which are accounted for as part of the fossil fuels from which they are derived, and also as part of natural gas, supplemental gaseous fuels are removed from total energy for the residential, commercial, industrial, and electric power sectors.

Specific details for each of the end-use sectors are described below.

Residential Sector

Solar thermal direct use energy and photovoltaic electricity net generation for the residential and commercial sectors combined (SOHCB) is included only in the residential sector because the individual sector use cannot be identified:

TERCB = CLRCB + NGRCB + PARCB + GERCB + SOHCB + WDRCB + ESRCB + LORCB - SFRCB

Commercial Sector

From 1960 through 1992:

TECCB = CLCCB + NGCCB + PACCB + ENCCB + GECCB + HYCCB + WDCCB + WSCCB + ESCCB + LOCCB - SFCCB

From 1993 forward:

TECCB = CLCCB + NGCCB + PACCB + ESCCB+ GECCB + HYCCB + WDCCB + WSCCB + LOCCB - SFCCB

Industrial Sector

The industrial sector includes energy losses and co-products from the production of fuel ethanol (ENLCB). It includes net imports of coal coke (CCNIBUS) in the U.S. total but not in the individual State estimates because no reliable means of allocating the U.S. amount to the States has been developed.

From 1960 through 1992:

TEICBUS = CLICBUS + CCNIBUS + NGICBUS + PAICBUS + ENICBUS + ENLCBUS + GEICBUS + HYICBUS + WDICBUS + WSICBUS + ESICBUS + LOICBUS - SFINBUS

TEICBZZ = CLICBZZ + NGICBZZ + PAICBZZ + ENICBZZ + ENLCBZZ + GEICBZZ + HYICBZZ + WDICBZZ + WSICBZZ + ESICBZZ + LOICBZZ - SFINBZZ

From 1993 forward:

TEICBUS =

CLICBUS + CCNIBUS + NGICBUS + PAICBUS + ENLCBUS + GEICBUS + HYICBUS + WDICBUS + WSICBUS + ESICBUS + LOICBUS - SFINBUS

TEICBZZ = CLICBZZ + NGICBZZ + PAICBZZ + ESICBZZ + GEICBZZ + HYICBZZ + WDICBZZ + WSICBZZ + LOICBZZ + ENLCBZZ - SFINBZZ

Transportation Sector

From 1960 through 1992:

TEACB = CLACB + NGACB + PAACB + ENACB + ESACB + LOACB

From 1993 forward:

TEACB = CLACB + NGACB + PAACB + ESACB + LOACB

The sum of total energy consumed by the four end-use sectors should equal total energy consumption calculated by summing all energy sources. As a cross-check that is not used in the report tables, the sum of the consumption by the four end-use sectors for each State and U.S. total is also calculated in SEDS:

TESSB = TERCB + TECCB + TEICB + TEACB

The slight discrepancies between TESSB and TETCB are caused by independent rounding of the components.

Total Net Energy

A set of totals is calculated to estimate consumption in the four major end use sectors excluding each sector's share of all electrical system energy losses that are incurred in the generation, transmission, and distribution of electricity. This series is total net energy consumed and is represented by "TN."

Total net energy consumed by the residential, commercial, industrial, and transportation sectors are calculated:

TNRCB = TERCB – LORCB
TNICB = TEICB – LOICB
TNCCB = TECCB – LOCCB
TNACB = TEACB – LOACB

Total Energy Consumed per Capita

The energy consumed per person residing in each State and in the United States is estimated by dividing the total energy series ("TE") by the resident population as published by the U.S. Department of Commerce, Bureau of the Census. The U.S. total population may be revised more frequently than the State population estimates, so the sum of the available States' population data may not equal the U.S. totals. Therefore, the U.S. total population is input into SEDS instead of being calculated as the sum of the States' values. The variable names for the series are ("ZZ" in the variable name represents the two-letter State code that differs for each State):

TPOPPZZ = resident population of each State; and
TPOPPUS = resident population of the United States.

Estimated energy consumption per capita for each State and the United States, in million Btu, is represented by "TETPB" and is calculated:

TETPB = TETCB / TPOPP

The residential, commercial, industrial, and transportation sectors' energy consumption per capita are estimated:

TERPB = TERCB / TPOPP
TECPB = TECCB / TPOPP
TEIPB = TEICB / TPOPP
TEAPB = TEACB / TPOPP

Data Sources

TPOPPUS — Resident population of the United States. July 1 estimates for all years.

- 1960 through 1989: U.S. Department of Commerce, Bureau of the Census http://www.census.gov/popest/archives/1990s/popclockest.txt.
- 1990 through 1999: U.S. Department of Commerce, Bureau of the Census, Internet Release http://www.census.gov/popest/archives/2000s/vintage_2001/CO-EST2001-12/.
- 2000 forward: http://www.census.gov/popest/states/NST-ann-est.html.

TPOPPZZ — Resident population by State. July 1 estimates for all years.

- 1960 and 1970: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1980,* Section 1 Population, "No. 10. Resident Population--States: 1950 to 1979".
- 1980: U.S. Department of Commerce, Bureau of the Census, http://www.census.gov/popest/archives/1980s/s5yr8090.txt.
- 1960 through 1989: U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, "Population Estimates and Projections," Series P-25. Specific publication numbers and table numbers:
  - 1961 through 1969: Number 460, Table 1.
  - 1971 through 1979: Number 957, Table 4.
  - 1981 through 1989: Number 1058, Table 3.
- 1990 through 1999: U.S. Department of Commerce, Bureau of the Census, Internet Release http://www.census.gov/popest/archives/2000s/vintage_2001/CO-EST2001-12/index.html.
- 2000 forward: http://www.census.gov/popest/states/NST-ann-est.html.

Total Energy Consumed per Real Dollar of Gross Domestic Product

Total energy consumed per chained (2000) dollar of output by State and the United States is estimated by dividing the total energy series ("TE") by real gross domestic product (GDP) as published by the U.S. Department of Commerce, Bureau of Economic Analysis, beginning in 1977. The U.S real GDP is extracted from the same data source as the State data. This series does not match the national account GDP series. For details, see BEA Regional Economic Accounts: Methodologies, http://www.bea.gov/regional/methods.cfm.

For 1977 through 1989, BEA does not provide the real GDP by State estimates. However, BEA's quantity indexes for real GDP by State (2000=100.000) are used to calculate real GDP from 1977 to 1989. For 1990 through 1996, BEA reports real GDP by State based on the Standard Industrial Classification (SIC). For 1997 forward, BEA reports real GDP by State based on the North American Industry Classification System (NAICS). Given this discontinuity in the GDP by States series at 1997, users of these data are strongly cautioned against appending the two data series in an attempt to construct a single time series of GDP by State estimates.

The variable names for the series are ("ZZ" in the variable name represents the two-letter State code that differs for each State):

GDPRXUS = real gross domestic product of the United States in million chained (2000) dollars.; and

GDPRXZZ = real gross domestic product by State in million chained (2000) dollars.

Estimated energy consumption per real chained (2000) dollar for each State and the United States, in thousand Btu per chained (2000) dollar, is represented by "TETGR" and is calculated:

TETGR = TETCB / GDPRX

Data Sources

GDPRXUS — Real gross domestic product of the United States in million chained (2000) dollars.

- 1977 through 1996: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=SIC.

- 1997 forward: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=NAICS.

GDPRXZZ — Real gross domestic product by State in million chained (2000) dollars.

- 1977 through 1996: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=SIC.
- 1997 forward: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=NAICS.

Appendix A

State Energy Data System Variables

This is an alphabetical listing of all the variable names used in the State Energy Data System (SEDS). Provided for each variable on the system are: a brief description of the variable; units of the variable as found in SEDS; and the formulas used in SEDS to create the variable. If a variable is not one created by SEDS but is entered into the system, it is described as an independent variable. Formulas are provided for the State calculations ("ZZ" in the variable name would be replaced by the two-letter code for each State) and for the U.S. calculation (wherever appropriate).

Variables in SEDS have seven-letter names that consist of the following components:

Character Positions:	**1 and 2**	**3 and 4**	**5**	**6 and 7**
Identify:	Type of energy	Energy activity or consumption end-use sector	Type of data	Geographic area

Characters 1 through 4 are explained in the description of each variable.

Character 5 is always one of the following:

B = Data in British thermal units (Btu)
K = Factor for converting data from physical units to Btu
M = Data in alternative physical units
P = Data in standardized physical units
S = Share or ratio expressed as a fraction
V = Value added in manufacture.

Characters 6 and 7 are two-letter U.S. Postal Service codes for the 50 States and the District of Columbia (represented by "ZZ" in the following variable names) and the United States ("US"). In this system, the United States means the 50 States and the District of Columbia. Some estimates of electricity sales and losses are derived by using only the contiguous 48 States and the District of Columbia. The variables used in those calculations are identified by "48" as characters 6 and 7 in the variable names.

ABICB	Aviation gasoline blending components total consumed by the industrial sector.	Billion Btu	ABICBZZ = ABTCBZZ ABICBUS = ABTCBUS
ABICP	Aviation gasoline blending components total consumed by the industrial sector.	Thousand barrels	ABICPZZ = ABTCPZZ ABICPUS = ABTCPUS
ABTCB	Aviation gasoline blending components total consumed.	Billion Btu	ABTCBZZ = ABTCPZZ * 5.048 ABTCBUS = ΣABTCBZZ
ABTCP	Aviation gasoline blending components total consumed.	Thousand barrels	ABTCPZZ = (COCAPZZ / COCAPUS) * ABTCPUS ABTCPUS is independent.
AICAP	Aluminum ingot production capacity.	Short tons	AICAPZZ is independent. AICAPUS = ΣAICAPZZ
ARICB	Asphalt and road oil consumed by the industrial sector.	Billion Btu	ARICBZZ = ARICPZZ * 6.636 ARICBUS = ΣARICBZZ
ARICP	Asphalt and road oil consumed by the industrial sector.	Thousand barrels	ARICPZZ = ASICPZZ + RDICPZZ ARICPUS = ΣARICPZZ
ARTCB	Asphalt and road oil total consumed.	Billion Btu	ARTCBZZ = ARICBZZ ARTCBUS = ARICBUS
ARTCP	Asphalt and road oil total consumed.	Thousand barrels	ARTCPZZ = ASTCPZZ + RDTCPZZ ARTCPUS = ΣARTCPZZ
ASICP	Asphalt consumed by the industrial sector.	Thousand barrels	ASICPZZ = (ASINPZZ / ASINPUS) * ASTCPUS ASICPUS = ΣASICPZZ
ASINP	Asphalt sold to the industrial sector.	Short tons	ASINPZZ is independent. ASINPUS = ΣASINPZZ
ASTCP	Asphalt total consumed.	Thousand barrels	ASTCPZZ = ASICPZZ ASTCPUS is independent.
AVACB	Aviation gasoline consumed by the transportation sector.	Billion Btu	AVACBZZ = AVACPZZ * 5.048 AVACBUS = ΣAVACBZZ
AVACP	Aviation gasoline consumed by the transportation sector.	Thousand barrels	AVACPZZ = (AVTTPZZ / AVTTPUS) * AVTCPUS AVACPUS = ΣAVACPZZ
AVMIP	Aviation gasoline issued to the military.	Thousand barrels	AVMIPZZ is independent. AVMIPUS = ΣAVMIPZZ

AVNMM	Aviation gasoline sold to nonmilitary users.	Thousand gallons	AVNMMZZ is independent. AVNMMUS = ΣAVNMMZZ
AVNMP	Aviation gasoline sold to nonmilitary users.	Thousand barrels	AVNMPZZ = AVNMMZZ / 42 AVNMPUS = ΣAVNMPZZ
AVTCB	Aviation gasoline total consumed.	Billion Btu	AVTCBZZ = AVACBZZ AVTCBUS = ΣAVTCBZZ
AVTCP	Aviation gasoline total consumed.	Thousand barrels	AVTCPZZ = AVACPZZ AVTCPUS is independent.
AVTTP	Aviation gasoline total sales to the transportation sector.	Thousand barrels	AVTTPZZ = AVNMPZZ + AVMIPZZ AVTTPUS = ΣAVTTPZZ
BMTCB	Biomass total consumed.	Billion Btu	BMTCB = WWTCB + ENTCB + ENLCB
CCEXBUS	Coal coke exported from the United States.	Billion Btu	CCEXBUS = CCEXPUS * 24.80
CCEXPUS	Coal coke exported from the United States.	Thousand short tons	CCEXPUS is independent.
CCIMBUS	Coal coke imported into the United States.	Billion Btu	CCIMBUS = CCIMPUS * 24.80
CCIMPUS	Coal coke imported into the United States.	Thousand short tons	CCIMPUS is independent.
CCNIBUS	Coal coke net imports into the United States.	Billion Btu	CCNIBUS = CCIMBUS – CCEXBUS
CCNIPUS	Coal coke net imports into the United States.	Thousand short tons	CCNIPUS = CCIMPUS – CCEXPUS
CGVAV	Value added in the manufacture of corrugated and solid fiber boxes.	Million dollars	CGVAVZZ is independent. CGVAVUS = ΣCGVAVZZ
CLACB	Coal consumed by the transportation sector.	Billion Btu	CLACBZZ = CLACPZZ * CLACKZZ CLACBUS = ΣCLACBZZ
CLACK	Factor for converting coal consumed by the transportation sector from physical units to Btu.	Million Btu per short ton	CLACKZZ is independent. CLACKUS = CLACBUS / CLACPUS
CLACP	Coal consumed by the transportation sector.	Thousand short tons	CLACPZZ = (CLICPZZ / CLICPUS) * CLACPUS CLACPUS is independent.
CLCCB	Coal consumed by the commercial sector.	Billion Btu	CLCCBZZ = CLCCPZZ * CLHCKZZ CLCCBUS = ΣCLCCBZZ
CLCCP	Coal consumed by the commercial sector.	Thousand short tons	CLCCP = CLHCPZZ - CLRCPZZ CLCCPUS = ΣCLCCPZZ

CLEIB	Coal consumed by the electric power sector.	Billion Btu	CLEIBZZ = CLEIPZZ * CLEIKZZ CLEIBUS = ΣCLEIBZZ
CLEIK	Factor for converting coal consumed by the electric power sector from physical units to Btu.	Million Btu per short ton	CLEIKZZ is independent. CLEIKUS = CLEIBUS / CLEIPUS
CLEIP	Coal consumed by the electric power sector.	Thousand short tons	CLEIPZZ is independent CLEIPUS = ΣCLEIPZZ
CLHCB	Coal consumed by the residential and commercial sectors.	Billion Btu	CLHCBZZ = CLCCBZZ + CLRCBZZ CLHCBUS = ΣCLHCBZZ
CLHCK	The factor for converting coal consumed by the residential and commercial sectors from physical units to Btu.	Million Btu per short ton	CLHCKZZ is independent. CLHCKUS = CLHCBUS / CLHCPUS
CLHCP	Coal consumed by the residential and commercial sectors.	Thousand short tons	CLHCPZZ = (CLHDPZZ / CLHDPUS) * CLHCPUS CLHCPUS is independent.
CLHDP	Coal distributed to the residential and commercial sectors.	Thousand short tons	CLHDPZZ is independent. CLHDPUS = ΣCLHDPZZ
CLICB	Coal consumed by the industrial sector.	Billion Btu	CLICBZZ = CLKCBZZ + CLOCBZZ CLICBUS = ΣCLICBZZ
CLICP	Coal consumed by the industrial sector.	Thousand short tons	CLICPZZ = CLKCPZZ + CLOCPZZ CLICPUS = ΣCLICPZZ
CLKCB	Coal consumed at coke plants (coking coal).	Billion Btu	CLKCBZZ = CLKCPZZ * CLKCKZZ CLKCBUS = ΣCLKCBZZ
CLKCK	The factor for converting coal consumed at at coke plants from physical units to Btu.	Million Btu per short ton	CLKCKZZ is independent. CLKCKUS = CLKCBUS / CLKCPUS
CLKCP	Coal consumed by coke plants (coking coal).	Thousand short tons	CLKCPZZ = (CLKDPZZ / CLKDPUS) * CLKCPUS CLKCPUS is independent.
CLKDP	Coal distributed to coke plants (coking coal).	Thousand short tons	CLKDPZZ is independent. CLKDPUS = ΣCLKDPZZ
CLOCB	Coal consumed by other industrial users.	Billion Btu	CLOCBZZ = CLOCPZZ * CLOCKZZ CLOCBUS = ΣCLOCBZZ
CLOCK	The factor for converting coal consumed by other industrial users from physical units to Btu.	Million Btu per short ton	CLOCKZZ is independent. CLOCKUS = CLOCBUS / CLOCPUS

CLOCP	Coal consumed by other industrial users.	Thousand short tons	CLOCPZZ = (CLODPZZ / CLODPUS) * CLOCPUS CLOCPUS is independent.
CLODP	Coal distributed to other industrial users.	Thousand short tons	CLODPZZ is independent. CLODPUS = ΣCLODPZZ
CLRCB	Coal consumed by the residential sector.	Billion Btu	CLRCBZZ = CLRCPZZ * CLHCKZZ CLRCBUS = ΣCLRCBZZ
CLRCP	Coal consumed by the residential sector.	Thousand short tons	CLRCPZZ = CLHCPZZ * CLRCSUS CLRCPUS = ΣCLRCPZZ
CLRCSUS	The share of residential and commercial coal consumed by the residential sector.	Percent	CLRCSUS is independent.
CLTCB	Coal total consumed.	Billion Btu	CLTCBZZ = CLRCBZZ + CLCCBZZ + CLICBZZ + CLACBZZ + CLEIBZZ CLTCBUS = ΣCLTCBZZ
CLTCP	Coal total consumed.	Thousand short tons	CLTCPZZ = CLRCPZZ + CLCCPZZ + CLICPZZ + CLACPZZ + CLEIPZZ CLTCPUS = ΣCLTCPZZ
COCAP	Crude oil operating capacity at refineries.	Barrels per calendar day	COCAPZZ is independent. COCAPUS = ΣCOCAPZZ
COICB	Crude oil consumed by the industrial sector.	Billion Btu	COICBZZ = COTCBZZ COICBUS = COTCBUS
COICP	Crude oil consumed by the industrial sector.	Thousand barrels	COICPZZ = COTCPZZ COICPUS = COTCPUS
COTCB	Crude oil consumed in petroleum industry operations.	Billion Btu	COTCBZZ = COTCPZZ * 5.800 COTCBUS = ΣCOTCBZZ
COTCP	Crude oil consumed in petroleum industry operations.	Thousand barrels	COTCPZZ is independent. COTCPUS = ΣCOTCPZZ
CTCAP	Catalytic cracking charge capacity of petroleum refineries.	1960 through 1979: Barrels per calendar day 1980 forward: Barrels per stream day	CTCAPZZ is independent. CTCAPUS = ΣCTCAPZZ
DFACB	Distillate fuel oil consumed by the transportation sector.	Billion Btu	DFACBZZ = DFACPZZ * 5.825 DFACBUS = ΣDFACBZZ

DFACP	Distillate fuel oil consumed by the transportation sector.	Thousand barrels	DFACPZZ = (DFTRPZZ / DFNDPZZ) * DFNCPZZ DFACPUS = ΣDFACPZZ
DFBKP	Distillate fuel oil sales for vessel bunkering use, excluding that sold to the Armed Forces.	Thousand barrels	DFBKPZZ is independent. DFBKPUS = ΣDFBKPZZ
DFCCB	Distillate fuel oil consumed by the commercial sector.	Billion Btu	DFCCBZZ = DFCCPZZ * 5.825 DFCCBUS = ΣDFCCBZZ
DFCCP	Distillate fuel oil consumed by the commercial sector.	Thousand barrels	DFCCPZZ = (DFCMPZZ / DFNDPZZ) * DFNCPZZ DFCCPUS = ΣDFCCPZZ
DFCMP	Distillate fuel oil sales to the commercial sector.	Thousand barrels	DFCMPZZ is independent. DFCMPUS = ΣDFCMPZZ
DFEIB	Distillate fuel oil consumed by the electric power sector.	Billion Btu	DFEIBZZ = DFEIPZZ * 5.825 DFEIBUS = ΣDFEIBZZ
DFEIP	Distillate fuel oil (excluding kerosene-type jet fuel) consumed by the electric power sector.	Thousand barrels	DFEIPZZ = DKEIPZZ – JKEUPZZ DFEIPUS = ΣDFEIPZZ
DFIBP	Distillate fuel oil sales for industrial space heating and other industrial use, including farm use.	Thousand barrels	DFIBPZZ is independent. DFIBPUS = ΣDFIBPZZ
DFICB	Distillate fuel oil consumed by the industrial sector.	Billion Btu	DFICBZZ = DFICPZZ * 5.825 DFICBUS = ΣDFICBZZ
DFICP	Distillate fuel oil consumed by the industrial sector.	Thousand barrels	DFICPZZ = (DFINPZZ / DFNDPZZ) * DFNCPZZ DFICPUS = ΣDFICPZZ
DFINP	Distillate fuel oil sales to the industrial sector.	Thousand barrels	DFINPZZ = DFIBPZZ + DFOCPZZ + DFOFPZZ + DFOTPZZ DFINPUS = ΣDFINPZZ
DFMIP	Distillate fuel oil sales to the Armed Forces, regardless of use.	Thousand barrels	DFMIPZZ is independent. DFMIPUS = ΣDFMIPZZ
DFNCP	Distillate fuel oil consumption by all sectors other than the electric power sector.	Thousand barrels	DFNCPZZ = (DFNDPZZ / DFNDPUS) * DFNCPUS DFNCPUS = DFTCPUS – DFEIPUS
DFNDP	Distillate fuel oil sales to all sectors other than the electric power sector.	Thousand barrels	DFNDPZZ = DFRSPZZ + DFCMPZZ + DFINPZZ + DFTRPZZ DFNDPUS = ΣDFNDPZZ

DFOCP	Distillate fuel oil sales for use by oil companies.	Thousand barrels	DFOCPZZ is independent. DFOCPUS = ΣDFOCPZZ
DFOFP	Distillate fuel oil sales as diesel fuel for off-highway use.	Thousand barrels	DFOFPZZ is independent. DFOFPUS = ΣDFOFPZZ
DFONP	Distillate fuel oil sales as diesel fuel for on-highway use.	Thousand barrels	DFONPZZ is independent. DFONPUS = ΣDFONPZZ
DFOTP	Distillate fuel oil sales for all other uses not identified in other sales categories.	Thousand barrels	DFOTPZZ is independent. DFOTPUS = ΣDFOTPZZ
DFRCB	Distillate fuel oil consumed by the residential sector.	Billion Btu	DFRCBZZ = DFRCPZZ * 5.825 DFRCBUS = ΣDFRCBZZ
DFRCP	Distillate fuel oil consumed by the residential sector.	Thousand barrels	DFRCPZZ = (DFRSPZZ / DFNDPZZ) * DFNCPZZ DFRCPUS = ΣDFRCPZZ
DFRRP	Distillate fuel oil sales for use by railroads.	Thousand barrels	DFRRPZZ is independent. DFRRPUS = ΣDFRRPZZ
DFRSP	Distillate fuel oil sales to the residential sector.	Thousand barrels	DFRSPZZ is independent. DFRSPUS = ΣDFRSPZZ
DFTCB	Distillate fuel oil total consumed.	Billion Btu	DFTCBZZ = DFRCBZZ + DFCCBZZ + DFICBZZ + DFACBZZ + DFEIBZZ DFTCBUS = ΣDFTCBZZ
DFTCP	Distillate fuel oil total consumed.	Thousand barrels	DFTCPZZ = DFNCPZZ + DFEIPZZ DFTCPUS is independent.
DFTRP	Distillate fuel oil sales to the transportation sector.	Thousand barrels	DFTRPZZ = DFBKPZZ + DFMIPZZ + DFRRPZZ + DFONPZZ DFTRPUS = ΣDFTRPZZ
DKEIB	Distillate fuel oil and kerosene-type jet fuel consumed by the electric power sector.	Billion Btu	DKEIBZZ = DFEIBZZ + JKEUBZZ DKEIBUS = ΣDKEIBZZ
DKEIP	Distillate fuel oil and kerosene-type jet fuel consumed by the electric power sector.	Thousand barrels	DKEIPZZ is independent. DKEIPUS = ΣDKEIPZZ
ELEXB	Electricity exported from the United States.	Billion Btu	ELEXBZZ = ELEXPZZ * 3.412 ELEXBUS = ΣELEXBZZ
ELEXP	Electricity exported from the United States.	Million kilowatthours	ELEXPZZ is independent. ELEXPUS = ΣELEXPZZ

ELIMB	Electricity imported into the United States	Billion Btu	ELIMBZZ = ELIMPZZ * 3.412 ELIMBUS = ΣELIMBZZ
ELIMP	Electricity imported into the United States	Million kilowatthours	ELIMPZZ is independent. ELIMPUS = ΣELIMPZZ
ELISB	Net interstate flow of electricity. (Negative indicates flow out of State; positive indicates flow into State.)	Billion Btu	ELISBZZ = (ESTCBZZ + LOTCBZZ) – TEEIBZZ ELISBUS = ΣELISBZZ
ELLSS48	The ratio of electrical system energy losses to electricity sold in the contiguous 48 States and the District of Columbia.	Fraction	ELLSS48 = LOTCB48 / ESTCB48
ELNIB	Net imports of electricity into the United States.	Billion Btu	ELNIBZZ = ELIMBZZ - ELEXBZZ ELNIBUS = ΣELNIBZZ
ELNIP	Net imports of electricity into the United States.	Million kilowatthours	ELNIPZZ = ELIMPZZ - ELEXPZZ ELNIPUS = ΣELNIPZZ
ENACB	Fuel ethanol consumed by the transportation sector.	Billion Btu	ENACBZZ = (ENACPZZ * 3.563) ENACBUS = ΣENACBZZ
ENACP	Fuel ethanol consumed by the transportation sector.	Thousand barrels	ENACPZZ = (MGACPZZ / MGTCPZZ) * ENTCPZZ ENACPUS = ΣENACPZZ
ENCCB	Fuel ethanol consumed by the commercial sector.	Billion Btu	ENCCBZZ = (ENCCPZZ * 3.563) ENCCBUS = ΣENCCBZZ
ENCCP	Fuel ethanol consumed by the commercial sector.	Thousand barrels	ENCCPZZ = (MGCCPZZ / MGTCPZZ) * ENTCPZZ ENCCPUS = ΣENCCPZZ
ENICB	Fuel ethanol consumed by the industrial sector.	Billion Btu	ENICBZZ = (ENICPZZ * 3.563) ENICBUS = ΣENICBZZ
ENICP	Fuel ethanol consumed by the industrial sector.	Thousand barrels	ENICPZZ = (MGICPZZ / MGTCPZZ) * ENTCPZZ ENICPUS = ΣENICPZZ
ENLCB	Energy losses and co-products from the production of fuel ethanol.	Billion Btu	ENLCBZZ = (ENPRBZZ / ENPRBUS) * ENLCBUS ENLCBUS is independent.
ENPRB	Fuel ethanol production.	Billion Btu	ENPRBZZ = ENPRPZZ * 3.563 ENPRBUS = ΣENPRBZZ
ENPRP	Fuel ethanol production.	Thousand barrels	ENPRPZZ is independent. ENPRPUS = ΣENPRPZZ

ENTCB	Fuel ethanol total consumed.	Billion Btu	ENTCBZZ = ENACBZZ + ENCCBZZ + ENICBZZ ENTCBUS = ΣENTCBZZ
ENTCP	Fuel ethanol total consumed.	Thousand gallons	ENTCPZZ = (ENTRPZZ / ENTRPUS) * ENTCPUS ENTCPUS is independent.
ENTRP	Fuel ethanol blended into motor gasoline.	Thousand gallons	ENTRPZZ is independent. ENTRPUS = ΣENTRPZZ
ESACB	Electricity consumed by (i.e., sold to) the transportation sector.	Billion Btu	ESACBZZ = ESACPZZ * 3.412 ESACBUS = ΣESACBZZ
ESACP	Electricity consumed by (i.e., sold to) the transportation sector.	Million kilowatthours	ESACPZZ = ESTRPZZ ESACPUS = ΣESACPZZ
ESCCB	Electricity consumed by (i.e., sold to) the commercial sector.	Billion Btu	ESCCBZZ = ESCCPZZ * 3.412 ESCCBUS = ΣESCCBZZ
ESCCP	Electricity consumed by (i.e., sold to) the commercial sector.	Million kilowatthours	ESCCPZZ = ESCMPZZ + ESOTPZZ – ESACPZZ ESCCPUS = ΣESCCPZZ
ESCMP	Electricity sold to a portion of the commercial sector.	Million kilowatthours	ESCMPZZ is independent. ESCMPUS = ΣESCMPZZ
ESICB	Electricity consumed by (i.e., sold to) the industrial sector.	Billion Btu	ESICBZZ = ESICPZZ * 3.412 ESICBUS = ΣESICBZZ
ESICP	Electricity consumed by (i.e., sold to) the industrial sector.	Million kilowatthours	ESICPZZ is independent. ESICPUS = ΣESICPZZ
ESOTP	Electricity sold to the "Other" sector (i.e., public street and highway lighting, sales to other public authorities, railroads and railways, and interdepartmental sales).	Million kilowatthours	ESOTPZZ is independent. ESOTPUS = ΣESOTPZZ
ESRCB	Electricity consumed by (i.e., sold to) the residential sector.	Billion Btu	ESRCBZZ = ESRCPZZ * 3.412 ESRCBUS = ΣESRCBZZ
ESRCP	Electricity consumed by (i.e., sold to) the residential sector.	Million kilowatthours	ESRCPZZ is independent. ESRCPUS = ΣESRCPZZ
ESTCB	Electricity total consumed (i.e., sold).	Billion Btu	ESTCBZZ = ESTCPZZ * 3.412 ESTCBUS = ΣESTCBZZ ESTCB48 = ESTCBUS – (ESTCBAK + ESTCBHI)

ESTCP	Electricity total consumed (i.e., sold).	Million kilowatthours	ESTCPZZ = ESRCPZZ + ESCCPZZ + ESICPZZ + ESACPZZ ESTCPUS = ΣESTCPZZ
ESTRP	Electricity consumed by transit systems.	Million kilowatthours	ESTRPZZ is independent. ESTRPUS = ΣESTRPZZ
ESTRSUS	The share of electricity sold to the "Other" sector (ESOTP) that is used for transportation.	Fraction	ESTRSUS = ESACPUS / ESOTPUS
FFETKUS	Fossil-fueled steam-electric power plant conversion factor.	Thousand Btu per kilowatthour	FFETKUS is independent.
FFTCB	Fossil fuels, total consumed.	Billion Btu	FFTCBZZ = CLTCBZZ + NNTCBZZ + PMTCBZZ FFTCBUS = CLTCBZZ + CCNIBUS + NNTCBZZ + PMTCBZZ
FNICB	Petrochemical feedstocks, naphtha less than 401° F, consumed by the industrial sector.	Billion Btu	FNICBZZ = FNTCBZZ FNICBUS = FNTCBUS
FNICP	Petrochemical feedstocks, naphtha less than 401° F, consumed by the industrial sector.	Thousand barrels	FNICPZZ = FNTCPZZ FNICPUS = FNTCPUS
FNTCB	Petrochemical feedstocks, naphtha less than 401° F, total consumed.	Billion Btu	FNTCBZZ = FNTCPZZ * 5.248 FNTCBUS = ΣFNTCBZZ
FNTCP	Petrochemical feedstocks, naphtha less than 401° F, total consumed.	Thousand barrels	FNTCPZZ = (OCVAVZZ / OCVAVUS) * FNTCPUS FNTCPUS is independent.
FOICB	Petrochemical feedstocks, other oils equal to or greater than 401° F, consumed by the industrial sector.	Billion Btu	FOICBZZ = FOTCBZZ FOICBUS = FOTCBUS
FOICP	Petrochemical feedstocks, other oils equal to or greater than 401° F, consumed by the industrial sector.	Thousand barrels	FOICPZZ = FOTCPZZ FOICPUS = FOTCPUS
FOTCB	Petrochemical feedstocks, other oils equal to or greater than 401° F, total consumed.	Billion Btu	FOTCBZZ = FOTCPZZ * 5.825 FOTCBUS = ΣFOTCBZZ
FOTCP	Petrochemical feedstocks, other oils equal to or greater than 401° F, total consumed.	Thousand barrels	FOTCPZZ = (OCVAVZZ / OCVAVUS) * FOTCPUS FOTCPUS is independent.
FSICB	Petrochemical feedstocks, still gas, consumed by the industrial sector.	Billion Btu	FSICBZZ = FSTCBZZ FSICBUS = FSTCBUS

FSICP	Petrochemical feedstocks, still gas, consumed by the industrial sector.	Thousand barrels	FSICPZZ = FSTCPZZ FSICPUS = FSTCPUS
FSTCB	Petrochemical feedstocks, still gas, total consumed.	Billion Btu	FSTCBZZ = FSTCPZZ * 6.000 FSTCBUS = ΣFSTCBZZ
FSTCP	Petrochemical feedstocks, still gas, total consumed.	Thousand barrels	FSTCPZZ = (COCAPZZ / COCAPUS) * FSTCPUS FSTCPUS is independent.
GDPRX	Real gross domestic product.	Million chained (2000) dollars	GDPRXZZ is independent. GDPRXUS is independent.
GECCB	Direct use of geothermal energy and heat pumps in the commercial sector.	Billion Btu	GECCBZZ is independent. GECCBUS = ΣGECCBZZ
GEEGB	Electricity produced from geothermal energy by the electric power sector.	Billion Btu	GEEGBZZ = GEEGPZZ * GEETKUS GEEGBUS = ΣGEEGBZZ
GEEGP	Electricity produced from geothermal energy by the electric power sector.	Million kilowatthours	GEEGPZZ is independent. GEEGPUS = ΣGEEGPZZ
GEETKUS	Factor for converting electricity produced from geothermal energy from physical units to Btu.	Thousand Btu per kilowatthour	GEETKUS is independent.
GEICB	Direct use of geothermal energy and heat pumps in the industrial sector.	Billion Btu	GEICBZZ is independent. GEICBUS = ΣGEICBZZ
GERCB	Direct use of geothermal energy and heat pumps in the residential sector.	Billion Btu	GERCBZZ is independent. GERCBUS = ΣGERCBZZ
GETCB	Geothermal total energy consumed.	Billion Btu	GETCBZZ = GERCBZZ + GECCBZZ + GEICBZZ + GEEGBZZ GETCBUS = ΣGETCBZZ
HVC5P	Electricity produced from conventional hydropower in the commercial sector.	Million kilowatthours	HVC5PZZ is independent. HVC5PUS = ΣHVC5PZZ
HVEGB	Electricity produced from conventional hydropower by the electric power sector.	Billion Btu	HVEGBZZ = HVEGPZZ * FFETKUS HVEGBUS = ΣHVEGZZ
HVEGP	Electricity produced from conventional hydropower by the electric power sector.	Million kilowatthours	HVEGPZZ is independent. HVEGPUS = ΣHVEGPZZ
HVI5P	Electricity produced from conventional hydropower in the commercial sector.	Million kilowatthours	HVI5PZZ is independent. HVI5PUS = ΣHVI5PZZ

HYCCB	Electricity produced from conventional hydropower in the commercial sector.	Billion Btu	HYCCBZZ = HYCCPZZ * FFETKUS HYCCBUS = ΣHYCCBZZ
HYCCP	Electricity produced from conventional hydropower in the commercial sector.	Million kilowatthours	HYCCPZZ = HVC5PZZ HYCCPUS = ΣHYCCPZZ
HYEGB	Electricity produced from all types of hydropower by the electric power sector.	Billion Btu	HYEGBZZ = HYEGPZZ * FFETKUS HYEGBUS = ΣHYEGBZZ
HYEGP	Electricity produced from all types of hydropower by the electric power sector.	Million kilowatthours	HYEGPZZ = HVEGPZZ HYEGPUS = ΣHYEGPZZ
HYICB	Electricity produced from conventional hydropower in the industrial sector.	Billion Btu	HYICBZZ = HYICPZZ * FFETKUS HYICBUS = ΣHYICBZZ
HYICP	Electricity produced from conventional hydropower in the industrial sector.	Million kilowatthours	HYICPZZ = HVI5PZZ HYICPUS = ΣHYICPZZ
HYTCB	Electricity produced from hydropower; total production.	Billion Btu	HYTCBZZ = HYCCBZZ + HYEGBZZ + HYICBZZ HYTCBUS = ΣHYTCBZZ
HYTCP	Electricity produced from hydropower; total production.	Million kilowatthours	HYTCPZZ = HYCCPZZ + HYEGPZZ + HYICPZZ HYTCPUS = ΣHYTCPZZ
JFACB	Jet fuel consumed by the transportation sector.	Billion Btu	JFACBZZ = JKACBZZ + JNACBZZ JFACBUS = ΣJFACBZZ
JFACP	Jet fuel consumed by the transportation sector.	Thousand barrels	JFACPZZ = JKACPZZ + JNACPZZ JFACPUS = ΣJFACPZZ
JFEUB	Jet fuel consumed by electric power sector.	Billion Btu	JFEUBZZ = JKEUBZZ JFEUBUS = JKEUBUS
JFEUP	Jet fuel consumed by electric power sector.	Thousand barrels	JFEUPZZ = JKEUPZZ JFEUPUS = JKEUPUS
JFTCB	Jet fuel total consumed.	Billion Btu	JFTCBZZ = JFACBZZ + JFEUBZZ JFTCBUS = ΣJFTCBZZ
JFTCP	Jet fuel total consumed.	Thousand barrels	JFTCPZZ = JFACPZZ + JFEUPZZ JFTCPUS = ΣJFTCPZZ
JKACB	Kerosene-type jet fuel consumed by the transportation sector.	Billion Btu	JKACBZZ = JKACPZZ * 5.670 JKACBUS = ΣJKACBZZ

JKACP	Kerosene-type jet fuel consumed by the transportation sector.	Thousand barrels	JKACPZZ = (JKTTPZZ / JKTTPUS) * JKACPUS JKACPUS = JKTCPUS – JKEUPUS
JKEUB	Kerosene-type jet fuel consumed by electric power sector.	Billion Btu	JKEUBZZ = JKEUPZZ * 5.670 JKEUBUS = ΣJKEUBZZ
JKEUP	Kerosene-type jet fuel consumed by electric power sector.	Thousand barrels	JKEUPZZ is independent. JKEUPUS = ΣJKEUPZZ
JKTCB	Kerosene-type jet fuel total consumed.	Billion Btu	JKTCBZZ = JKTCPZZ * 5.670 JKTCBUS = ΣJKTCBZZ
JKTCP	Kerosene-type jet fuel total consumed.	Thousand barrels	JKTCPZZ = JKACPZZ + JKEUPZZ JKTCPUS is independent.
JKTTP	Kerosene-type jet fuel total sold.	Thousand gallons	JKTTPZZ is independent. JKTTPUS = ΣJKTTPZZ
JNACB	Naphtha-type jet fuel consumed by the transportation sector.	Billion Btu	JNACBZZ = JNTCBZZ JNACBUS = JNTCBUS
JNACP	Naphtha-type jet fuel consumed by the transportation sector.	Thousand barrels	JNACPZZ = JNTCPZZ JNACPUS = JNTCPUS
JNMIP	Naphtha-type jet fuel issued to the military.	Thousand barrels	JNMIPZZ is independent. JNMIPUS = ΣJNMIPZZ
JNTCB	Naphtha-type jet fuel total consumed.	Billion Btu	JNTCBZZ = JNTCPZZ * 5.355 JNTCBUS = ΣJNTCBZZ
JNTCP	Naphtha-type jet fuel total consumed.	Thousand barrels	JNTCPZZ = (JNMIPZZ / JNMIPUS) * JNTCPUS JNTCPUS is independent.
KSCCB	Kerosene consumed by the commercial sector.	Billion Btu	KSCCBZZ = KSCCPZZ * 5.670 KSCCBUS = ΣKSCCBZZ
KSCCP	Kerosene consumed by the commercial sector.	Thousand barrels	KSCCPZZ = (KSCMPZZ / KSTTPZZ) * KSTCPZZ KSCCPUS = ΣKSCCPZZ
KSCMP	Kerosene sold to the commercial sector.	Thousand barrels	KSCMPZZ is independent. KSCMPUS = ΣKSCMPZZ
KSICB	Kerosene consumed by the industrial sector.	Billion Btu	KSICBZZ = KSICPZZ * 5.670 KSICBUS = ΣKSICBZZ

KSICP	Kerosene consumed by the industrial sector.	Thousand barrels	KSICPZZ = (KSINPZZ / KSTTPZZ) * KSTCPZZ KSICPUS = ΣKSICPZZ
KSIHP	Kerosene sold for industrial heating.	Thousand barrels	KSIHPZZ is independent. KSIHPUS = ΣKSIHPZZ
KSINP	Kerosene sold to the industrial sector.	Thousand barrels	KSINPZZ = KSOTPZZ + KSIHPZZ KSINPUS = ΣKSINPZZ
KSOTP	Kerosene sold for all other uses, including farm use.	Thousand barrels	KSOTPZZ is independent. KSOTPUS = ΣKSOTPZZ
KSRCB	Kerosene consumed by the residential sector.	Billion Btu	KSRCBZZ = KSRCPZZ * 5.670 KSRCBUS = ΣKSRCBZZ
KSRCP	Kerosene consumed by the residential sector.	Thousand barrels	KSRCPZZ = (KSRSPZZ / KSTTPZZ) * KSTCPZZ KSRCPUS = ΣKSRCPZZ
KSRSP	Kerosene sold to the residential sector.	Thousand barrels	KSRSPZZ is independent. KSRSPUS = ΣKSRSPZZ
KSTCB	Kerosene total consumed.	Billion Btu	KSTCBZZ = KSRCBZZ + KSICBZZ + KSCCBZZ KSTCBUS = ΣKSTCBZZ
KSTCP	Kerosene total consumed.	Thousand barrels	KSTCPZZ = (KSTTPZZ / KSTTPUS) * KSTCPUS KSTCPUS is independent.
KSTTP	Kerosene total sold.	Thousand barrels	KSTTPZZ = KSRSPZZ + KSCMPZZ + KSINPZZ KSTTPUS = ΣKSTTPZZ
LGACB	LPG consumed by the transportation sector.	Billion Btu	LGACBZZ = LGACPZZ * LGTCKUS LGACBUS = ΣLGACBZZ
LGACP	LPG consumed by the transportation sector.	Thousand barrels	LGACPZZ = LGCBPZZ * LGTRSUS LGACPUS = ΣLGACPZZ
LGCBM	LPG sales for internal combustion engine use.	Thousand gallons	LGCBMZZ is independent. LGCBMUS = ΣLGCBMZZ
LGCBP	LPG consumed for internal combustion engine use.	Thousand barrels	LGCBPZZ = LGCBMZZ / 42 LGCBPUS = ΣLGCBPZZ
LGCCB	LPG consumed by the commercial sector.	Billion Btu	LGCCBZZ = LGCCPZZ * LGTCKUS LGCCBUS = ΣLGCCBZZ

LGCCP	LPG consumed by the commercial sector.	Thousand barrels	LGCCPZZ = LGHCPZZ * 0.15 LGCCPUS = ΣLGCCPZZ
LGCCS	The share of residential and commercial LPG consumed by the commercial sector.	Percent	LGCCSZZ is independent.
LGHCM	LPG sold for residential and commercial use.	Thousand gallons	LGHCMZZ is independent. LGHCMUS = ΣLGHCMZZ
LGHCP	LPG consumed by the residential and commercial sectors.	Thousand barrels	LGHCPZZ = LGHCMZZ / 42 LGHCPUS = ΣLGHCPZZ
LGICB	LPG consumed by the industrial sector.	Billion Btu	LGICBZZ = LGICPZZ * LGTCKUS LGICBUS = ΣLGICBZZ
LGICP	LPG consumed by the industrial sector.	Thousand barrels	LGICPZZ = LGTCPZZ – (LGRCPZZ + LGCCPZZ + LGACPZZ) LGICPUS = ΣLGICPZZ
LGRCB	LPG consumed by the residential sector.	Billion Btu	LGRCBZZ = LGRCPZZ * LGTCKUS LGRCBUS = ΣLGRCBZZ
LGRCP	LPG consumed by the residential sector.	Thousand barrels	LGRCPZZ = LGHCPZZ * 0.85 LGRCPUS = ΣLGRCPZZ
LGRCS	The share of residential and commercial LPG consumed by the residential sector.	Percent	LGRCSZZ is independent.
LGTCB	LPG total consumed.	Billion Btu	LGTCBZZ = LGRCBZZ + LGCCBZZ + LGICBZZ + LGACBZZ LGTCBUS = ΣLGTCBZZ
LGTCKUS	Factor for converting LPG from physical units to Btu.	Million Btu per barrel	LGTCKUS is independent.
LGTCP	LPG total consumed.	Thousand barrels	LGTCPZZ = (LGTTPZZ / LGTTPUS) * LGTCPUS LGTCPUS is independent.
LGTRSUS	The transportation sector's share of LPG internal combustion engine sales.	Fraction	LGTRSUS is independent.
LGTTP	LPG total sold.	Thousand gallons	LGTTPZZ is independent. LGTTPUS = ΣLGTTPZZ
LOACB	The transportation sector's share of electrical system energy losses.	Billion Btu	LOACBZZ = ESACBZZ * ELLSS48 Exceptions:

			LOACBAK = (ESACBAK / ESTCBAK) * LOTCBAK LOACBHI = (ESACBHI / ESTCBHI) * LOTCBHI LOACBUS = ΣLOACBZZ
LOCCB	The commercial sector's share of electrical system energy losses.	Billion Btu	LOCCBZZ = ESCCBZZ * ELLSS48 Exceptions: LOCCBAK = (ESCCBAK / ESTCBAK) * LOTCBAK LOCCBHI = (ESCCBHI / ESTCBHI) * LOTCBHI LOCCBUS = ΣLOCCBZZ
LOICB	The industrial sector's share of electrical system energy losses.	Billion Btu	LOICBZZ = ESICBZZ * ELLSS48 Exceptions: LOICBAK = (ESICBAK / ESTCBAK) * LOTCBAK LOICBHI = (ESICBHI / ESTCBHI) * LOTCBHI LOICBUS = ΣLOICBZZ
LORCB	The residential sector's share of electrical system energy losses.	Billion Btu	LORCBZZ = ESRCBZZ * ELLSS48 Exceptions: LORCBAK = (ESRCBAK / ESTCBAK) * LOTCBAK LORCBHI = (ESRCBHI / ESTCBHI) * LOTCBHI LORCBUS = ΣLORCBZZ
LOTCB	Total electrical system energy losses.	Billion Btu	LOTCBZZ = ESTCBZZ * ELLSS48 Exceptions: LOTCBAK = TEEIBAK – ESTCBAK LOTCBHI = TEEIBHI – ESTCBHI LOTCBUS = TEEIBUS – ESTCBUS LOTCB48 = LOTCBUS – (LOTCBAK + LOTCBHI)
LUACB	Lubricants consumed by the transportation sector.	Billion Btu	LUACBZZ = LUACPZZ * 6.065 LUACBUS = ΣLUACBZZ
LUACP	Lubricants consumed by the transportation sector.	Thousand barrels	LUACPZZ = (LUTRPZZ / LUTTPZZ) * LUTCPZZ LUACPUS = ΣLUACPZZ
LUICB	Lubricants consumed by the industrial sector.	Billion Btu	LUICBZZ = LUICPZZ * 6.065 LUICBUS = ΣLUICBZZ
LUICP	Lubricants consumed by the industrial sector.	Thousand barrels	LUICPZZ = (LUINPZZ / LUTTPZZ) * LUTCPZZ LUICPUS = ΣLUICPZZ
LUINP	Lubricants sold to the industrial sector.	Thousand barrels	LUINPZZ is independent. LUINPUS = ΣLUINPZZ
LUTCB	Lubricants total consumed.	Billion Btu	LUTCBZZ = LUICBZZ + LUACBZZ LUTCBUS = ΣLUTCBZZ

LUTCP	Lubricants total consumed.	Thousand barrels	LUTCPZZ = (LUTTPZZ / LUTTPUS) * LUTCPUS LUTCPUS is independent.
LUTRP	Lubricants sold to the transportation sector.	Thousand barrels	LUTRPZZ is independent. LUTRPUS = ΣLUTRPZZ
LUTTP	Lubricants total sold.	Thousand barrels	LUTTPZZ = LUINPZZ + LUTRPZZ LUTTPUS = ΣLUTTPZZ
MBICB	Motor gasoline blending components consumed by the industrial sector.	Billion Btu	MBICBZZ = MBTCBZZ MBICBUS = MBTCBUS
MBICP	Motor gasoline blending components consumed by the industrial sector.	Thousand barrels	MBICPZZ = MBTCPZZ MBICPUS = MBTCPUS
MBTCB	Motor gasoline blending components total consumed.	Billion Btu	MBTCBZZ = MBTCPZZ * 5.253 MBTCBUS = ΣMBTCBZZ
MBTCP	Motor gasoline blending components total consumed.	Thousand barrels	MBTCPZZ = (COCAPZZ / COCAPUS) * MBTCPUS MBTCPUS is independent.
MGACB	Motor gasoline consumed by the transportation sector.	Billion Btu	MGACBZZ = MGACPZZ * MGTCKUS MGACBUS = ΣMGACBZZ
MGACP	Motor gasoline consumed by the transportation sector.	Thousand barrels	MGACPZZ = (MGTRPZZ / MGTTPZZ) * MGTCPZZ MGACPUS = ΣMGACPZZ
MGAGP	Motor gasoline sold for agricultural use.	Thousand gallons	MGAGPZZ is independent. MGAGPUS = ΣMGAGPZZ
MGCCB	Motor gasoline consumed by the commercial sector.	Billion Btu	MGCCBZZ = MGCCPZZ * MGTCKUS MGCCBUS = ΣMGCCBZZ
MGCCP	Motor gasoline consumed by the commercial sector.	Thousand barrels	MGCCPZZ = (MGCMPZZ / MGTTPZZ) * MGTCPZZ MGCCPUS = ΣMGCCPZZ
MGCMP	Motor gasoline sold to the commercial sector.	Thousand gallons	MGCMPZZ = MGMSPZZ + MGPNPZZ MGCMPUS = ΣMGCMPZZ
MGCUP	Motor gasoline sold for construction use.	Thousand gallons	MGCUPZZ is independent. MGCUPUS = ΣMGCUPZZ
MGICB	Motor gasoline consumed by the industrial sector.	Billion Btu	MGICBZZ = MGICPZZ * MGTCKUS MGICBUS = ΣMGICBZZ

MGICP	Motor gasoline consumed by the industrial sector.	Thousand barrels	MGICPZZ = (MGINPZZ / MGTTPZZ) * MGTCPZZ MGICPUS = ΣMGICPZZ
MGINP	Motor gasoline sold to the industrial sector.	Thousand gallons	MGINPZZ = MGAGPZZ + MGCUPZZ + MGIYPZZ MGINPUS = ΣMGINPZZ
MGIYP	Motor gasoline sold for industrial and commercial use (Federal Highway Administration terminology).	Thousand gallons	MGIYPZZ is independent MGIYPUS = ΣMGIYPZZ
MGMFP	Motor gasoline sold for highway use.	Thousand gallons	MGMFPZZ is independent. MGMFPUS = ΣMGMFPZZ
MGMRP	Motor gasoline sold for marine use.	Thousand gallons	MGMRPZZ is independent. MGMRPUS = ΣMGMRPZZ
MGMSP	Motor gasoline sold for miscellaneous and unclassified uses.	Thousand gallons	MGMSPZZ is independent. MGMSPUS = ΣMGMSPZZ
MGPNP	Motor gasoline sold for public nonhighway use.	Thousand gallons	MGPNPZZ is independent. MGPNPUS = ΣMGPNPZZ
MGSFP	Motor gasoline special fuels sold (primarily diesel fuel with small amounts of liquefied petroleum gases).	Thousand gallons	MGSFPZZ is independent. MGSFPUS = ΣMGSFPZZ
MGTCB	Motor gasoline total consumed.	Billion Btu	MGTCBZZ = MGCCBZZ + MGICBZZ + MGACBZZ MGTCBUS = ΣMGTCBZZ
MGTCP	Motor gasoline total consumed.	Thousand barrels	MGTCPZZ = (MGTTPZZ / MGTTPUS) * MGTCPUS MGTCPUS is independent.
MGTCKUS	Factor for converting motor gasoline from physical units to Btu.	Million Btu per barrel	MGTCKUS is independent.
MGTRP	Motor gasoline sold to the transportation sector.	Thousand gallons	MGTRPZZ = MGMFPZZ + MGMRPZZ – MGSFPZZ MGTRPUS = ΣMGTRPZZ
MGTTP	Motor gasoline total sold.	Thousand gallons	MGTTPZZ = MGCMPZZ + MGINPZZ + MGTRPZZ MGTTPUS = ΣMGTTPZZ
MMTCB	Motor gasoline total consumed, excluding fuel ethanol	Billion Btu	MMTCBZZ = MGTCBZZ - ENTCBZZ MMTCBUS = MGTCBUS - ENTCBUS
MSICB	Miscellaneous petroleum products consumed by the industrial sector.	Billion Btu	MSICBZZ = MSTCBZZ MSICBUS = MSTCBUS

MSICP	Miscellaneous petroleum products consumed by the industrial sector.	Thousand barrels	MSICPZZ = MSTCPZZ MSICPUS = MSTCPUS
MSTCB	Miscellaneous petroleum products total consumed.	Billion Btu	MSTCBZZ = MSTCPZZ * 5.796 MSTCBUS = ΣMSTCBZZ
MSTCP	Miscellaneous petroleum products total consumed.	Thousand barrels	MSTCPZZ = (OCVAVZZ / OCVAVUS) * MSTCPUS MSTCPUS is independent.
NAICB	Natural gasoline consumed by the industrial sector.	Billion Btu	NAICBZZ = NATCBZZ NAICBUS = NATCBUS
NAICP	Natural gasoline consumed by the industrial sector.	Thousand barrels	NAICPZZ = NATCPZZ NAICPUS = NATCPUS
NATCB	Natural gasoline total consumed.	Billion Btu	NATCBZZ = NATCPZZ * 4.620 NATCBUS = ΣNATCBZZ
NATCP	Natural gasoline total consumed.	Thousand barrels	NATCPZZ = (OCVAVZZ / OCVAVUS) * NATCPUS NATCPUS is independent.
NGACB	Natural gas consumed by the transportation sector.	Billion Btu	NGACBZZ = NGACPZZ * NGTXKZZ NGACBUS = ΣNGACBZZ
NGACP	Natural gas consumed by the transportation sector.	Million cubic feet	NGACPZZ = NGPZPZZ + NGVHPZZ NGACPUS = ΣNGACPZZ
NGCCB	Natural gas delivered to the commercial sector, used as consumption (including supplemental gaseous fuels).	Billion Btu	NGCCBZZ = NGCCPZZ * NGTXKZZ NGCCBUS = ΣNGCCBZZ
NGCCP	Natural gas delivered to the commercial sector, used as consumption (including supplemental gaseous fuels).	Million cubic feet	NGCCPZZ is independent. NGCCPUS = ΣNGCCPZZ
NGEIB	Natural gas consumed by the electric power sector (including supplemental gaseous fuels).	Billion Btu	NGEIBZZ = NGEIPZZ * NGEIKZZ NGEIBUS = ΣNGEIBZZ
NGEIK	Factor for converting natural gas consumed by the electric power sector from physical units to Btu.	Thousand Btu per cubic foot	NGEIKZZ is independent. NGEIKUS = NGEIBUS / NGEIPUS
NGEIP	Natural gas consumed by the electric power sector (including supplemental gaseous fuels).	Million cubic feet	NGEIPZZ is independent. NGEIPUS = ΣNGEIPZZ
NGICB	Natural gas consumed by the industrial sector (including supplemental gaseous fuels).	Billion Btu	NGICBZZ = NGICPZZ * NGTXKZZ NGICBUS = ΣNGICBZZ

NGICP	Natural gas consumed by the industrial sector (including supplemental gaseous fuels).	Million cubic feet	NGICPZZ = NGINPZZ + NGLEPZZ + NGPLPZZ NGICPUS = ΣNGICPZZ
NGINP	A portion of the natural gas delivered to the industrial sector.	Million cubic feet	NGINPZZ is independent. NGINPUS = ΣNGINPZZ
NGLEP	Natural gas consumed as lease fuel.	Million cubic feet	NGLEPZZ is independent. NGLEPUS = ΣNGLEPZZ
NGLPB	Natural gas consumed as lease and plant fuel.	Billion Btu	NGLPBZZ = NGLPPZZ * NGTXKZZ NGLPBUS = ΣNGLPBZZ
NGLPP	Natural gas consumed as lease and plant fuel.	Million cubic feet	NGLPPZZ = NGLEPZZ + NGPLPZZ NGLPPUS = ΣNGLPPZZ
NGPLP	Natural gas consumed as plant fuel.	Million cubic feet	NGPLPZZ is independent. NGPLPUS = ΣNGPLPZZ
NGPZB	Natural gas consumed as pipeline fuel.	Billion Btu	NGPZBZZ = NGPZPZZ * NGTXKZZ NGPZBUS = ΣNGPZBZZ
NGPZP	Natural gas consumed as pipeline fuel.	Million cubic feet	NGPZPZZ is independent. NGPZPUS = ΣNGPZPZZ
NGRCB	Natural gas delivered to the residential sector, used as consumption (including supplemental gaseous fuels).	Billion Btu	NGRCBZZ = NGRCPZZ * NGTXKZZ NGRCBUS = ΣNGRCBZZ
NGRCP	Natural gas delivered to the residential sector, used as consumption (including supplemental gaseous fuels).	Million cubic feet	NGRCPZZ is independent. NGRCPUS = ΣNGRCPZZ
NGSFP	Supplemental gaseous fuels supplies.	Million cubic feet	NGSFPZZ is independent. NGSFPUS = ΣNGSFPZZ
NGTCB	Natural gas total consumed (including supplemental gaseous fuels).	Billion Btu	NGTCBZZ = NGTCPZZ * NGTCKZZ NGTCBUS = ΣNGTCBZZ
NGTCK	Factor for converting natural gas total consumed from physical units to Btu.	Thousand Btu per cubic foot	NGTCKZZ is independent. NGTCKUS = NGTCBUS / NGTCPUS
NGTCP	Natural gas total consumed (including supplemental gaseous fuels).	Million cubic feet	NGTCPZZ = NGRCPZZ + NGCCPZZ + NGICPZZ + NGACPZZ + NGEIPZZ NGTCPUS = ΣNGTCPZZ

NGTXK	Factor for converting natural gas consumed by all sectors other than the electric utility sector from physical units to Btu.	Thousand Btu per cubic foot	NGTXKZZ = (NGTCBZZ – NGEIBZZ) / (NGTCPZZ – NGEIPZZ) NGTXKUS = (NGTCBUS – NGEIBUS) / (NGTCPUS – NGEIPUS)
NGTZP	Natural gas consumed in sectors that have supplemental gaseous fuels commingled with natural gas.	Million cubic feet	NGTZPZZ = NGCCPZZ + NGRCPZZ + NGINPZZ + NGEIPZZ NGTZPUS = ΣNGTZPZZ
NGVHB	Natural gas consumed as vehicle fuel.	Billion Btu	NGVHBZZ = NGVHPZZ * NGTXKZZ NGVHBUS = ΣNGVHBZZ
NGVHP	Natural gas consumed as vehicle fuel.	Million cubic feet	NGVHPZZ is independent. NGVHPUS = ΣNGVHPZZ
NNACB	Natural gas consumed by the transportation sector.	Billion Btu	NNACBZZ = NGACBZZ NNACBUS = ΣNNACBZZ
NNCCB	Natural gas consumed by the commercial sector (excluding supplemental gaseous fuels).	Billion Btu	NNCCBZZ = NGCCBZZ – SFCCBZZ NNCCBUS = ΣNNCCBZZ
NNEIB	Natural gas consumed by the electric power sector (excluding supplemental gaseous fuels).	Billion Btu	NNEIBZZ = NGEIBZZ – SFEIBZZ NNEIBUS = ΣNNEIBZZ
NNICB	Natural gas consumed by the industrial sector (excluding supplemental gaseous fuels).	Billion Btu	NNICBZZ = NGICBZZ – SFINBZZ NNICBUS = ΣNNICBZZ
NNRCB	Natural gas consumed by the residential sector (excluding supplemental gaseous fuels).	Billion Btu	NNRCBZZ = NGRCBZZ – SFRCBZZ NNRCBUS = ΣNNRCBZZ
NNTCB	Natural gas total consumed (excluding supplemental gaseous fuels).	Billion Btu	NNTCBZZ = NGTCBZZ – SFTCBZZ NNTCBUS = ΣNNTCBZZ
NUEGB	Electricity produced from nuclear power in the electric power sector.	Billion Btu	NUEGBZZ = NUEGPZZ * NUETKUS NUEGBUS = ΣNUEGBZZ
NUEGP	Electricity produced from nuclear power in the electric power sector.	Million kilowatthours	NUEGPZZ is independent. NUEGPUS = ΣNUEGPZZ
NUETB	Electricity total produced from nuclear power.	Billion Btu	NUETBZZ = NUEGBZZ NUETBUS = ΣNUETBZZ
NUETKUS	Factor for converting electricity produced from nuclear power from physical units to Btu.	Thousand Btu per kilowatthour	NUETKUS is independent.

NUETP	Electricity total produced from nuclear power.	Million kilowatthours	NUETPZZ = NUEGPZZ NUETPUS = ΣNUETPZZ
OCVAV	Value added in manufacture of industrial organic chemicals.	Million dollars	OCVAVZZ is independent. OCVAVUS = ΣOCVAVZZ
P1ICB	Asphalt and road oil, kerosene, lubricants, and "other petroleum products" consumed by the industrial sector.	Billion Btu	P1ICBZZ = ARICBZZ + KSICBZZ + LUICBZZ + POICBZZ P1ICBUS = ΣP1ICBZZ
P1ICP	Asphalt and road oil, kerosene, lubricants, and "other petroleum products" consumed by the industrial sector.	Thousand barrels	P1ICPZZ = ARICPZZ + KSICPZZ + LUICPZZ + POICPZZ P1ICPUS = ΣP1ICPZZ
P1TCB	Asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products" total consumed.	Billion Btu	P1TCBZZ = ARTCBZZ + AVTCBZZ + KSTCBZZ + LUTCBZZ + POTCBZZ P1TCBUS = ΣP1TCBZZ
P1TCP	Asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products" total consumed.	Thousand barrels	P1TCPZZ = ARTCPZZ + AVTCPZZ + KSTCPZZ + LUTCPZZ + POTCPZZ P1TCPUS = ΣP1TCPZZ
PAACB	All petroleum products consumed by the transportation sector.	Billion Btu	PAACBZZ = AVACBZZ + DFACBZZ + JKACBZZ + JNACBZZ + LGACBZZ + LUACBZZ + MGACBZZ + RFACBZZ PAACBUS = ΣPAACBZZ
PAACKUS	Factor for converting all petroleum products consumed by the transportation sector from physical units to Btu.	Million Btu per barrel	PAACKUS = PAACBUS / PAACPUS
PAACP	All petroleum products consumed by the transportation sector.	Thousand barrels	PAACPZZ = AVACPZZ + DFACPZZ + JKACPZZ + JNACPZZ + LGACPZZ + LUACPZZ + MGACPZZ + RFACPZZ PAACPUS = ΣPAACPZZ
PACCB	All petroleum products consumed by the commercial sector.	Billion Btu	PACCBZZ = DFCCBZZ + KSCCBZZ + LGCCBZZ + MGCCBZZ + PCCCBZZ + RFCCBZZ PACCBUS = ΣPACCBZZ
PACCKUS	Factor for converting all petroleum products consumed by the commercial sector from physical units to Btu.	Million Btu per barrel	PACCKUS = PACCBUS / PACCPUS
PACCP	All petroleum products consumed by the commercial sector.	Thousand barrels	PACCPZZ = DFCCPZZ + KSCCPZZ + LGCCPZZ + MGCCPZZ + PCCCPZZ + RFCCPZZ

			PACCPUS = ΣPACCPZZ
PAEIB	All petroleum products consumed by the electric power sector.	Billion Btu	PAEIBZZ = DFEIBZZ + JKEUBZZ + PCEIBZZ + RFEIBZZ PAEIBUS = ΣPAEIBZZ
PAEIKUS	Factor for converting all petroleum products consumed by the electric power sector from physical units to Btu.	Million Btu per barrel	PAEIKUS = PAEIBUS / PAEIPUS
PAEIP	All petroleum products consumed by the electric power sector.	Thousand barrels	PAEIPZZ = DFEIPZZ + JKEUPZZ + PCEIPZZ + RFEIPZZ PAEIPUS = ΣPAEIPZZ
PAHCBUS	All petroleum products consumed by the residential and commercial sectors combined.	Billion Btu	PAHCBUS = PARCBUS + PACCBUS
PAHCKUS	Factor for converting all petroleum products consumed by the residential and commercial sectors combined from physical units to Btu.	Million Btu per barrel	PAHCKUS = PAHCBUS / PAHCPUS
PAHCPUS	All petroleum products consumed by the residential and commercial sectors combined.	Thousand barrels	PAHCPUS = PARCPUS + PACCPUS
PAICB	All petroleum products consumed by the industrial sector.	Billion Btu	PAICBZZ = ARICBZZ + DFICBZZ + KSICBZZ + LGICBZZ + LUICBZZ + MGICBZZ + RFICBZZ + POICBZZ PAICBUS = ΣPAICBZZ
PAICKUS	Factor for converting all petroleum products consumed by the industrial sector from physical units to Btu.	Million Btu per barrel	PAICKUS = PAICBUS / PAICPUS
PAICP	All petroleum products consumed by the industrial sector.	Thousand barrels	PAICPZZ = ARICPZZ + DFICPZZ + KSICPZZ + LGICPZZ + LUICPZZ + MGICPZZ + RFICPZZ + POICPZZ PAICPUS = ΣPAICPZZ
PARCB	All petroleum products consumed by the residential sector.	Billion Btu	PARCBZZ = DFRCBZZ + KSRCBZZ + LGRCBZZ PARCBUS = ΣPARCBZZ
PARCKUS	Factor for converting all petroleum products consumed by the residential sector from physical units to Btu.	Million Btu per barrel	PARCKUS = PARCBUS / PARCPUS

PARCP	All petroleum products consumed by the residential sector.	Thousand barrels	PARCPZZ = DFRCPZZ + KSRCPZZ + LGRCPZZ PARCPUS = ΣPARCPZZ
PATCB	All petroleum products consumed by all sectors.	Billion Btu	PATCBZZ = ARTCBZZ + AVTCBZZ + DFTCBZZ + JKTCBZZ + JNTCBZZ + KSTCBZZ + LGTCBZZ + LUTCBZZ + MGTCBZZ + RFTCBZZ + POTCBZZ PATCBUS = ΣPATCBZZ
PATCKUS	Factor for converting all petroleum products consumed by all sectors from physical units to Btu.	Million Btu per barrel	PATCKUS = PATCBUS / PATCPUS
PATCP	All petroleum products consumed by all sectors.	Thousand barrels	PATCPZZ = ARTCPZZ + AVTCPZZ + DFTCPZZ + JKTCPZZ + JNTCPZZ + KSTCPZZ + LGTCPZZ + LUTCPZZ + MGTCPZZ + RFTCPZZ + POTCPZZ PATCPUS = ΣPATCPZZ
PCC3M	Petroleum coke consumed for combined heat and power in the commercial sector.	Thousand tons	PCC3MZZ is independent. PCC3MUS = ΣPCC3MZZ
PCCCB	Petroleum coke consumed for combined heat and power in the commercial sector.	Billion Btu	PCCCBZZ = PCCCPZZ * 6.024 PCCCBUS = ΣPCCCBZZ
PCCCP	Petroleum coke consumed for combined heat and power in the commercial sector.	Thousand barrels	PCCCPZZ = PCC3MZZ * 5 PCCCPUS = ΣPCCCPZZ
PCEIB	Petroleum coke consumed by the electric power sector.	Billion Btu	PCEIBZZ = PCEIPZZ * 6.024 PCEIBUS = ΣPCEIBZZ
PCEIM	Petroleum coke consumed by the electric power sector.	Thousand tons	PCEIMZZ is independent. PCEIMUS = ΣPCEIMZZ
PCEIP	Petroleum coke consumed by the electric power sector.	Thousand barrels	PCEIPZZ = PCEIMZZ * 5 PCEIPUS = ΣPCEIPZZ
PCI3B	Petroleum coke consumed for combined heat and power in the industrial sector.	Billion Btu	PCI3BZZ = PCI3PZZ * 6.024 PCI3BUS = ΣPCI3BZZ
PCI3M	Petroleum coke consumed for combined heat and power in the industrial sector.	Thousand tons	PCI3MZZ is independent. PCI3MUS = ΣPCI3MZZ
PCI3P	Petroleum coke consumed for combined heat and power in the industrial sector.	Thousand barrels	PCI3PZZ = PCI3MZZ * 5 PCI3PUS = ΣPCI3PZZ

PCICB	Petroleum coke consumed in the industrial sector.	Billion Btu	PCICBZZ = PCICPZZ * 6.024 PCICBUS = ΣPCICBZZ
PCICP	Petroleum coke consumed in the industrial sector.	Thousand barrels	PCICPZZ = PCI3PZZ + PCRFPZZ + PCOCPZZ PCICPUS = PCTCPUS – PCEIPUS – PCCCPUS
PCOCB	Petroleum coke consumed in the industrial sector other than for refinery use and combined heat and power.	Billion Btu	PCOCBZZ = PCOCPZZ * 6.024 PCOCBUS = ΣPCOCBZZ
PCOCP	Petroleum coke consumed in the industrial sector other than for refinery use and combined heat and power.	Thousand barrels	PCOCPZZ = (AICAPZZ / AICAPUS) * PCOCPUS PCOCPUS = PCICPUS – PCI3PUS – PCRFPUS
PCRFB	Petroleum coke used at refineries as both catalytic and marketable coke.	Billion Btu	PCRFBZZ = PCRFPZZ * 6.024 PCRFBUS = ΣPCRFBZZ
PCRFP	Petroleum coke used at refineries as both catalytic and marketable coke.	Thousand barrels	PCRFPZZ = (CTCAPZZ / CTCAPGZ) * PCRFPGZ or (CTCAPZZ / CTCAPPZ) * PCRFPPZ or is independent. PCRFPUS is independent.
PCTCB	Petroleum coke total consumed.	Billion Btu	PCTCBZZ = PCCCBZZ + PCICBZZ + PCEIBZZ PCTCBUS = ΣPCTCBZZ
PCTCP	Petroleum coke total consumed.	Thousand barrels	PCTCPZZ = PCCCPZZ + PCICPZZ + PCEIPZZ PCTCPUS is independent.
PIVAV	Value added in the manufacture of paints and allied products.	Million dollars	PIVAVZZ is independent. PIVAVUS = ΣPIVAVZZ
PLICB	Plant condensate consumed by the industrial sector.	Billion Btu	PLICBZZ = PLTCBZZ PLICBUS = PLTCBUS
PLICP	Plant condensate consumed by the industrial sector.	Thousand barrels	PLICPZZ = PLTCPZZ PLICPUS = PLTCPUS
PLTCB	Plant condensate total consumed.	Billion Btu	PLTCBZZ = PLTCPZZ * 5.418 PLTCBUS = ΣPLTCBZZ
PLTCP	Plant condensate total consumed.	Thousand barrels	PLTCPZZ = (OCVAVZZ / OCVAVUS) * PLTCPUS PLTCPUS is independent.
PMTCB	All petroleum products consumed by all sectors, excluding fuel ethanol blended into motor gasoline.	Billion Btu	PMTCBZZ = PATCBZZ - ENTCBZZ PMTCBUS = PATCBUS - ENTCBUS

POICB	Other petroleum products consumed by the industrial sector.	Billion Btu	POICBZZ = ABICBZZ + COICBZZ + FNICBZZ + FOICBZZ + FSICBZZ + MBICBZZ + MSICBZZ + NAICBZZ + PCICBZZ + PLICBZZ + PPICBZZ + SGICBZZ + SNICBZZ + UOICBZZ + USICBZZ + WXICBZZ POICBUS = ΣPOICBZZ
POICP	Other petroleum products consumed by the industrial sector.	Thousand barrels	POICPZZ = ABICPZZ + COICPZZ + FNICPZZ + FOICPZZ + FSICPZZ + MBICPZZ + MSICPZZ + NAICPZZ + PCICPZZ + PLICPZZ + PPICPZZ + SGICPZZ + SNICPZZ + UOICPZZ + USICPZZ + WXICPZZ POICPUS = ΣPOICPZZ
POTCB	Other petroleum products total consumed.	Billion Btu	POTCBZZ = ABTCBZZ + COTCBZZ + FNTCBZZ + FOTCBZZ + FSTCBZZ + MBTCBZZ + MSTCBZZ + NATCBZZ + PCTCBZZ + PLTCBZZ + PPTCBZZ + SGTCBZZ + SNTCBZZ + UOTCBZZ + USTCBZZ + WXTCBZZ POTCBUS = ΣPOTCBZZ
POTCP	Other petroleum products total consumed.	Thousand barrels	POTCPZZ = ABTCPZZ + COTCPZZ + FNTCPZZ + FOTCPZZ + FSTCPZZ + MBTCPZZ + MSTCPZZ + NATCPZZ + PCTCPZZ + PLTCPZZ + PPTCPZZ + SGTCPZZ + SNTCPZZ + UOTCPZZ + USTCPZZ + WXTCPZZ POTCPUS = ΣPOTCPZZ
PPICB	Pentanes plus consumed by the industrial sector.	Billion Btu	PPICBZZ = PPTCBZZ PPICBUS = PPTCBUS
PPICP	Pentanes plus consumed by the industrial sector.	Thousand barrels	PPICPZZ = PPTCPZZ PPICPUS = PPTCPUS
PPTCB	Pentanes plus total consumed.	Billion Btu	PPTCBZZ = PPTCPZZ * 4.620 PPTCBUS = ΣPPTCBZZ
PPTCP	Pentanes plus total consumed.	Thousand barrels	PPTCPZZ = (OCVAVZZ / OCVAVUS) * PPTCPUS PPTCPUS is independent.
RDICP	Road oil consumed by the industrial sector.	Thousand barrels	RDICPZZ = (RDINPZZ / RDINPUS) * RDTCPUS RDICPUS = ΣRDICPZZ

RDINP	Road oil sold to the industrial sector.	Short tons	RDINPZZ is independent. RDINPUS = ΣRDINPZZ
RDTCP	Road oil total consumed.	Thousand barrels	RDTCPZZ = RDICPZZ RDTCPUS is independent.
REACB	Renewable energy sources consumed by the transportation sector.	Billion Btu	REACBZZ = ENACBZZ REACBUS = ENACBUS
RECCB	Renewable energy sources consumed by the commercial sector.	Billion Btu	RECCBZZ = GECCBZZ + HYCCBZZ + WWCCBZZ RECCBUS = GECCBUS + HYCCBUS + WWCCBUS
REEIB	Renewable energy sources consumed by the electric power sector.	Billion Btu	REEIBZZ = HYEGBZZ + GEEGBZZ + SOEGBZZ+ WWEIBZZ + WYEGBZZ REEIBUS = HYEGBUS + GEEGBUS + SOEGBUS+ WWEIBUS + WYEGBUS
REICB	Renewable energy sources consumed by the industrial sector.	Billion Btu	REICBZZ = GEICBZZ + HYICBZZ + WWICBZZ + ENLCBZZ REICBUS = GEICBUS + HYICBUS + WWICBUS + ENLCBUS
RERCB	Renewable energy sources consumed by the residential sector.	Billion Btu	RERCBZZ = WDRCBZZ + GERCBZZ + SOHCBZZ RERCBUS = WDRCBUS + GERCBUS + SOHCBUS
RETCB	Renewable energy sources total consumed.	Billion Btu	RETCBZZ = RERCBZZ + RECCBZZ + REICBZZ + REACBZZ + REEIBZZ RETCBUS = RERCBUS + RECCBUS + REICBUS + REACBUS + REEIBUS
RFACB	Residual fuel oil consumed by the transportation sector.	Billion Btu	RFACBZZ = RFACPZZ * 6.287 RFACBUS = ΣRFACBZZ
RFACP	Residual fuel oil consumed by the transportation sector.	Thousand barrels	RFACPZZ = (RFTRPZZ / RFNDPZZ) * RFNCPZZ RFACPUS = ΣRFACPZZ
RFBKP	Residual fuel oil sold for vessel bunkering use, excluding deliveries to the Armed Forces.	Thousand barrels	RFBKPZZ is independent. RFBKPUS = ΣRFBKPZZ
RFCCB	Residual fuel oil consumed by the commercial sector.	Billion Btu	RFCCBZZ = RFCCPZZ * 6.287 RFCCBUS = ΣRFCCBZZ
RFCCP	Residual fuel oil consumed by the commercial sector.	Thousand barrels	RFCCPZZ = (RFCMPZZ / RFNDPZZ) * RFNCPZZ RFCCPUS = ΣRFCCPZZ
RFCMP	Residual fuel oil sold to the commercial sector.	Thousand barrels	RFCMPZZ is independent. RFCMPUS = ΣRFCMPZZ

RFEIB	Residual fuel oil consumed by the electric power sector.	Billion Btu	RFEIBZZ = RFEIPZZ * 6.287 RFEIBUS = ΣRFEIBZZ
RFEIP	Residual fuel oil consumed by the electric power sector.	Thousand barrels	RFEIPZZ is independent. RFEIPUS = ΣRFEIPZZ
RFIBP	A portion of residual fuel oil sold for industrial use, including industrial space heating.	Thousand barrels	RFIBPZZ is independent. RFIBPUS = ΣRFIBPZZ
RFICB	Residual fuel oil consumed by the industrial sector.	Billion Btu	RFICBZZ = RFICPZZ * 6.287 RFICBUS = ΣRFICBZZ
RFICP	Residual fuel oil consumed by the industrial sector.	Thousand barrels	RFICPZZ = (RFINPZZ / RFNDPZZ) * RFNCPZZ RFICPUS = ΣRFICPZZ
RFINP	Residual fuel oil sold to the industrial sector.	Thousand barrels	RFINPZZ = RFIBPZZ + RFOCPZZ + RFMSPZZ RFINPUS = ΣRFINPZZ
RFMIP	Residual fuel oil sold to the Armed Forces, regardless of use.	Thousand barrels	RFMIPZZ is independent. RFMIPUS = ΣRFMIPZZ
RFMSP	Residual fuel oil sold for miscellaneous uses.	Thousand barrels	RFMSPZZ is independent. RFMSPUS = ΣRFMSPZZ
RFNCP	Residual fuel oil consumption by all sectors other than the electric utility sector.	Thousand barrels	RFNCPZZ = (RFNDPZZ / RFNDPUS) * RFNCPUS RFNCPUS = RFTCPUS – RFEIPUS
RFNDP	Residual fuel oil sold to all sectors other than the electric utility sector.	Thousand barrels	RFNDPZZ = RFCMPZZ + RFINPZZ + RFTRPZZ RFNDPUS = ΣRFNDPZZ
RFOCP	Residual fuel oil sold for use by oil companies.	Thousand barrels	RFOCPZZ is independent. RFOCPUS = ΣRFOCPZZ
RFRRP	Residual fuel oil sold for use by railroads.	Thousand barrels	RFRRPZZ is independent. RFRRPUS = ΣRFRRPZZ
RFTCB	Residual fuel oil total consumed.	Billion Btu	RFTCBZZ = RFCCBZZ + RFICBZZ + RFACBZZ + RFEIBZZ RFTCBUS = ΣRFTCBZZ
RFTCP	Residual fuel oil total consumed.	Thousand barrels	RFTCPZZ = RFNCPZZ + RFEIPZZ RFTCPUS is independent.
RFTRP	Residual fuel oil sold to the transportation sector.	Thousand barrels	RFTRPZZ = RFBKPZZ + RFMIPZZ + RFRRPZZ RFTRPUS = ΣRFTRPZZ

SFCCB	Supplemental gaseous fuels consumed by the commercial sector.	Billion Btu	SFCCBZZ = SFCCPZZ * NGTXKZZ SFCCBUS = ΣSFCCBZZ
SFCCP	Supplemental gasesous fuels consumed by the commercial sector.	Million cubic feet	SFCCPZZ = NGSFPZZ * (NGCCPZZ / NGTZPZZ) SFCCPUS = ΣSFCCPZZ
SFEIB	Supplemental gaseous fuels consumed by the electric power sector.	Billion Btu	SFEIBZZ = SFEIPZZ * NGEIKZZ SFEIBUS = ΣSFEIBZZ
SFEIP	Supplemental gaseous fuels consumed by the electric power sector.	Million cubic feet	SFEIPZZ = NGSFPZZ * (NGEIPZZ / NGTZPZZ) SFEIPUS = ΣSFEIPZZ
SFINB	Supplemental gaseous fuels consumed by the industrial sector.	Billion Btu	SFINBZZ = SFINPZZ * NGTXKZZ SFINBUS = ΣSFINBZZ
SFINP	Supplemental gaseous fuels consumed by the industrial sector.	Million cubic feet	SFINPZZ = NGSFPZZ * (NGINPZZ / NGTZPZZ) SFINPUS = ΣSFINPZZ
SFRCB	Supplemental gaseous fuels consumed by the residential sector.	Billion Btu	SFRCBZZ = SFRCPZZ * NGTXKZZ SFRCBUS = ΣSFRCBZZ
SFRCP	Supplemental gaseous fuels consumed by the residential sector.	Million cubic feet	SFRCPZZ = NGSFPZZ * (NGRCPZZ / NGTZPZZ) SFRCPUS = ΣSFRCPZZ
SFTCB	Supplemental gaseous fuels total consumed.	Billion Btu	SFTCBZZ = SFCCBZZ + SFINBZZ + SFRCBZZ + SFEIBZZ SFTCBUS = ΣSFTCBZZ
SFTCP	Supplemental gaseous fuels total consumed.	Million cubic feet	SFTCPZZ = SFCCPZZ + SFINPZZ + SFRCPZZ + SFEIPZZ SFTCPUS = ΣSFTCPZZ
SGICB	Still gas consumed by the industrial sector.	Billion Btu	SGICBZZ = SGTCBZZ SGICBUS = SGTCBUS
SGICP	Still gas consumed by the industrial sector.	Thousand barrels	SGICPZZ = SGTCPZZ SGICPUS = SGTCPUS
SGTCB	Still gas total consumed.	Billion Btu	SGTCBZZ = SGTCPZZ * 6.000 SGTCBUS = ΣSGTCBZZ
SGTCP	Still gas total consumed.	Thousand barrels	SGTCPZZ = (COCAPZZ / COCAPUS) * SGTCPUS SGTCPUS is independent.
SNICB	Special naphthas consumed by the industrial sector.	Billion Btu	SNICBZZ = SNTCBZZ SNICBUS = SNTCBUS

SNICP	Special naphthas consumed by the industrial sector.	Thousand barrels	SNICPZZ = SNTCPZZ SNICPUS = SNTCPUS
SNTCB	Special naphthas total consumed.	Billion Btu	SNTCBZZ = SNTCPZZ * 5.248 SNTCBUS = ΣSNTCBZZ
SNTCP	Special naphthas total consumed.	Thousand barrels	SNTCPZZ = (PIVAVZZ / PIVAVUS) * SNTCPUS SNTCPUS is independent.
SOEGB	Electricity produced from photovoltaic and solar thermal energy by electric power sector.	Billion Btu	SOEGBZZ = SOEGPZZ * FFETKUS SOEGBUS = ΣSOEGBZZ
SOEGP	Electricity produced from photovoltaic and solar thermal energy by electric power sector.	Million kilowatthours	SOEGPZZ is independent. SOEGPUS = ΣSOEGPZZ
SOHCB	Solar thermal energy consumed by the residential and commercial sectors.	Billion Btu	SOHCBZZ = (SOTTPZZ / SOTTPUS) * SOHCBUS SOHCBUS is independent.
SOTCB	Photovoltaic and solar thermal energy sources total consumed.	Billion Btu	SOTCBZZ = SOHCBZZ + SOEGBZZ SOTCBUS = ΣSOTCBZZ
SOTTP	Shipments of solar thermal collectors.	Square feet	SOTTPZZ is independent. SOTTPUS = ΣSOTTPZZ
TEACB	Total energy consumed by the transportation sector.	Billion Btu	TEACBZZ = CLACBZZ + NGACBZZ + PAACBZZ + ESACBZZ + LOACBZZ TEACBUS = CLACBUS + NGACBUS + PAACBUS + ESACBUS + LOACBUS
TEAPB	The transportation sector's energy consumption per capita.	Million Btu	TEAPBZZ = TEACBZZ / TPOPPZZ TEAPBUS = TEACBUS / TPOPPUS
TECCB	Total energy consumed by the commercial sector.	Billion Btu	TECCBZZ = CLCCBZZ + NGCCBZZ + PACCBZZ + HYCCBZZ + WWCCBZZ + GECCBZZ + ESCCBZZ + LOCCBZZ - SFCCBZZ TECCBUS = CLCCBUS + NGCCBUS + PACCBUS + HYCCBUS + WWCCBUS + GECCBUS + ESCCBUS + LOCCBUS - SFCCBUS
TECPB	The commercial sector's energy consumption per capita.	Million Btu	TECPBZZ = TECCBZZ / TPOPPZZ TECPBUS = TECCBUS / TPOPPUS
TEEIB	Total energy consumed by the electric power sector plus net imports of electricity into the United States.	Billion Btu	TEEIBZZ = CLEIBZZ + NGEIBZZ + PAEIBZZ + HYEGBZZ + NUEGBZZ + GEEGBZZ + WWEIBZZ + SOEGBZZ+ WYEGBZZ + ELNIBZZ - SFEIBZZ TEEIBUS = ΣTEEIBZZ

TEICB	Total energy consumed by the industrial sector.	Billion Btu	TEICBZZ = CLICBZZ + NGICBZZ + PAICBZZ + HYICBZZ + WWICBZZ + GEICBZZ + ESICBZZ + LOICBZZ + ENLCBZZ - SFINBZZ TEICBUS = CLICBUS + CCNIBUS + NGICBUS + PAICBUS + HYICBUS + WWICBUS + GEICBUS + ESICBUS + LOICBUS + ENLCBUS - SFINBUS
TEIPB	The industrial sector's energy consumption per capita.	Million Btu	TEIPBZZ = TEICBZZ / TPOPPZZ TEIPBUS = TEICBUS / TPOPPUS
TERCB	Total energy consumed by the residential sector.	Billion Btu	TERCBZZ = CLRCBZZ + NGRCBZZ + PARCBZZ + WDRCBZZ + GERCBZZ + SOHCBZZ + ESRCBZZ + LORCBZZ - SFRCBZZ TERCBUS = CLRCBUS + NGRCBUS + PARCBUS + WDRCBUS + GERCBUS + SOHCBUS + ESRCBUS + LORCBUS - SFRCBUS
TERPB	The residential sector's energy consumption per capita.	Million Btu	TERPBZZ = TERCBZZ / TPOPPZZ TERPBUS = TERCBUS / TPOPPUS
TESSB	Total energy consumed (sum of the four end-use sectors). Cross-check not used in SEDS.	Billion Btu	TESSBZZ = TERCBZZ + TECCBZZ + TEICBZZ + TEACBZZ TESSBUS = TERCBUS + TECCBUS + TEICBUS + TEACBUS
TETCB	Total energy consumed.	Billion Btu	TETCBZZ = FFTCBZZ + NUETBZZ + RETCBZZ + ELNIBZZ + ELISBZZ TETCBUS = FFTCBUS + NUETBUS + RETCBUS + ELNIBUS
TETGR	Total energy consumed per dollar of real gross domestic product.	Thousand Btu per chained (2000) dollar	TETGRZZ = TETCBZZ / GDPRXZZ TETGRUS = TETCBUS / GDPRXUS
TETPB	Total energy consumption per capita.	Million Btu	TETPBZZ = TETCBZZ / TPOPPZZ TETPBUS = TETCBUS / TPOPPUS
TNACB	Total net energy consumed by the transportation sector excluding the sector's share of electrical system energy losses.	Billion Btu	TNACBZZ = TEACBZZ – LOACBZZ TNACBUS = TEACBUS – LOACBUS
TNCCB	Total net energy consumed by the commercial sector excluding the sector's share of electrical system energy losses.	Billion Btu	TNCCBZZ = TECCBZZ – LOCCBZZ TNCCBUS = TECCBUS – LOCCBUS

TNICB	Total net energy consumed by the industrial sector excluding the sector's share of electrical system energy losses.	Billion Btu	TNICBZZ = TEICBZZ – LOICBZZ TNICBUS = TEICBUS – LOICBUS
TNRCB	Total net energy consumed by the residential sector excluding the sector's share of electrical system energy losses.	Billion Btu	TNRCBZZ = TERCBZZ – LORCBZZ TNRCBUS = TERCBUS – LORCBUS
TPOPP	The resident population including the Armed Forces residing in each State.	Thousand	TPOPPZZ is independent. TPOPPUS is independent.
UOICB	Unfinished oils consumed by the industrial sector.	Billion Btu	UOICBZZ = UOTCBZZ UOICBUS = UOTCBUS
UOICP	Unfinished oils consumed by the industrial sector.	Thousand barrels	UOICPZZ = UOTCPZZ UOICPUS = UOTCPUS
UOTCB	Unfinished oils total consumed.	Billion Btu	UOTCBZZ = UOTCPZZ * 5.825 UOTCBUS = ΣUOTCBZZ
UOTCP	Unfinished oils total consumed.	Thousand barrels	UOTCPZZ = (COCAPZZ / COCAPUS) * UOTCPUS UOTCPUS is independent.
USICB	Unfractionated stream consumed by the industrial sector.	Billion Btu	USICBZZ = USTCBZZ USICBUS = USTCBUS
USICP	Unfractionated stream consumed by the industrial sector.	Thousand barrels	USICPZZ = USTCPZZ USICPUS = USTCPUS
USTCB	Unfractionated stream total consumed.	Billion Btu	USTCBZZ = USTCPZZ * 5.418 USTCBUS = ΣUSTCBZZ
USTCP	Unfractionated stream total consumed.	Thousand barrels	USTCPZZ = (OCVAVZZ / OCVAVUS) * USTCPUS USTCPUS is independent.
WDC3B	Wood consumed by CHP and electricity-only facilities in the commercial sector.	Billion Btu	WDC3BZZ is independent. WDC3BUS = ΣWDC3BZZ
WDC4B	Wood energy consumed for other uses in the commercial sector.	Billion Btu	WDC4BZZ = (WDRCPZZ / WDRCPUS) * WDC4BUS WDC4BUS =WDCCBUS – WDC3BUS
WDCCB	Wood energy consumed by the commercial sector, total.	Billion Btu	WDCCBZZ = WDC3BZZ + WDC4BZZ WDCCBUS is independent.
WDEIB	Wood consumed by the electric power sector.	Billion Btu	WDEIBZZ is independent. WDEIBUS = ΣWDEIBZZ

WDI3B	Wood consumed by CHP and electricity-only facilities in the industrial sector.	Billion Btu	WDI3BZZ is independent. WDI3BUS = ΣWDI3BZZ
WDI4B	Wood energy consumed for other uses in the industrial sector.	Billion Btu	WDI4BZZ is independent. WDI4BUS = ΣWDI4BZZ
WDICB	Wood energy consumed by the industrial sector, total.	Billion Btu	WDICBZZ = WDI3BZZ + WDI4BZZ WDICBUS = ΣWDICBZZ
WDRCB	Wood energy consumed by the residential sector.	Billion Btu	WDRCBZZ = WDRCPZZ * 20 WDRCBUS = ΣWDRCBZZ
WDRCP	Wood energy consumed by the residential sector.	Thousand cords	WDRCPZZ is independent. WDRCPUS = ΣWDRCPZZ
WDTCB	Wood energy, total consumed.	Billion Btu	WDTCBZZ = WDRCBZZ + WDCCBZZ + WDICBZZ + WDEIBZZ WDTCBUS = ΣWDTCBZZ
WSC3B	Waste consumed by CHP and electricity-only facilities in the commercial sector.	Billion Btu	WSC3BZZ is independent. WSC3BUS = ΣWSC3BZZ
WSCCB	Waste consumed in the commercial sector, total.	Billion Btu	WSCCBZZ = WSC3BZZ WSCCBUS = ΣWSCCBZZ
WSEIB	Waste consumed by the electric power sector.	Billion Btu	WSEIBZZ is independent. WSEIBUS = ΣWSEIBZZ
WSI3B	Waste consumed by CHP and electricity-only facilities in the industrial sector.	Billion Btu	WSI3BZZ is independent. WSI3BUS = ΣWSI3BZZ
WSI4B	Waste energy consumed for other uses in the industrial sector.	Billion Btu	WSI4BZZ is independent. WSI4BUS = ΣWSI4BZZ
WSICB	Waste energy consumed by the industrial sector, total.	Billion Btu	WSICBZZ = WSI3BZZ + WSI4BZZ WSICBUS = ΣWSICBZZ
WSTCB	Waste energy, total consumed.	Billion Btu	WSTCBZZ = WSCCBZZ + WSICBZZ + WSEIBZZ WSTCBUS = ΣWSTCBZZ
WWCCB	Wood and waste consumed in the commercial sector.	Billion Btu	WWCCBZZ = WDCCBZZ + WSCCBZZ WWCCBUS = ΣWWCCBZZ
WWEIB	Wood and waste consumed by the electric power sector.	Billion Btu	WWEIBZZ = WDEIBZZ + WSEIBZZ WWEIBUS = ΣWWEIBZZ

WWI4B	Wood and waste consumed in manufacturing processes in the industrial sector.	Billion Btu	WWI4BZZ = WDI4BZZ + WSI4BZZ WWI4BUS = ΣWWI4BZZ
WWICB	Wood and waste consumed in the industrial sector, total.	Billion Btu	WWICBZZ = WDICBZZ + WSICBZZ WWICBUS = ΣWWICBZZ
WWTCB	Wood and waste total consumed.	Billion Btu	WWTCBZZ = WDTCBZZ + WSTCBZZ WWTCBUS = ΣWWTCBZZ
WXICB	Waxes consumed by the industrial sector.	Billion Btu	WXICBZZ = WXTCBZZ WXICBUS = WXTCBUS
WXICP	Waxes consumed by the industrial sector.	Thousand barrels	WXICPZZ = WXTCPZZ WXICPUS = WXTCPUS
WXTCB	Waxes total consumed.	Billion Btu	WXTCBZZ = WXTCPZZ * 5.537 WXTCBUS = ΣWXTCBZZ
WXTCP	Waxes total consumed.	Thousand barrels	WXTCPZZ = (CGVAVZZ / CGVAVUS) * WXTCPUS WXTCPUS is independent.
WYEGB	Electricity produced from wind energy at electric power sector.	Billion Btu	WYEGBZZ = WYEGPZZ * FFETKUS WYEGBUS = ΣWYEGBZZ
WYEGP	Electricity produced from wind energy at electric power sector.	Million kilowatthours	WYEGPZZ is independent. WYEGPUS = ΣWYEGPZZ
WYTCB	Electricity produced from wind energy total produced.	Billion Btu	WYTCBZZ = WYEGBZZ WYTCBUS = ΣWYTCBZZ

Appendix B

Thermal Conversion Factors

Table B1. Approximate Heat Content of Petroleum and Heat Rates for Electricity, Selected Years, 1960-2008

	Petroleum Consumption			Electricity Net Generation		
	Liquefied Petroleum Gases (LGTCKUS)	Motor Gasoline (MGTCKUS)	Total Petroleum Products [a] (PATCKUS)	Fossil-Fueled Steam-Electric Plants [b] (FFETKUS)	Nuclear Steam-Electric Plants (NUETKUS)	Geothermal Energy Plants (GEETKUS)
Year	Million Btu per Barrel			Btu per Kilowatthour		
1960	4.011	5.253	5.55503	10,760	11,629	23,200
1965	4.011	5.253	5.53200	10,453	11,804	22,182
1970	3.779	5.253	5.50317	10,494	10,977	21,606
1975	3.715	5.253	5.49427	10,406	11,013	21,611
1976	3.711	5.253	5.50448	10,373	11,047	21,611
1977	3.677	5.253	5.51825	10,435	10,769	21,611
1978	3.669	5.253	5.51865	10,361	10,941	21,611
1979	3.680	5.253	5.49383	10,353	10,879	21,545
1980	3.674	5.253	5.47933	10,388	10,908	21,639
1981	3.643	5.253	5.44818	10,453	11,030	21,639
1982	3.615	5.253	5.41514	10,454	11,073	21,629
1983	3.614	5.253	5.40567	10,520	10,905	21,290
1984	3.599	5.253	5.39530	10,440	10,843	21,303
1985	3.603	5.253	5.38744	10,447	10,622	21,263
1986	3.640	5.253	5.41832	10,446	10,579	21,263
1987	3.659	5.253	5.40281	10,419	10,442	21,263
1988	3.652	5.253	5.41017	10,324	10,602	21,096
1989	3.683	5.253	5.40967	10,432	10,583	21,096
1990	3.625	5.253	5.41084	10,402	10,582	21,096
1991	3.614	5.253	5.38408	10,436	10,484	20,997
1992	3.624	5.253	5.37773	10,342	10,471	20,914
1993	3.606	5.253	5.37911	10,309	10,504	20,914
1994	3.635	[c] 5.230	5.36097	10,316	10,452	20,914
1995	3.623	5.215	5.34138	10,312	10,507	20,914
1996	3.613	5.216	5.33638	10,340	10,503	20,960
1997	3.616	5.213	5.33598	10,213	10,494	20,960
1998	3.614	5.212	5.34899	10,197	10,491	21,017
1999	3.616	5.211	5.32807	10,226	10,450	21,017
2000	3.607	5.210	5.32576	10,201	10,429	21,017
2001	3.614	5.210	5.34502	10,333	[R] 10,443	21,017
2002	3.613	5.208	5.32382	10,173	[R] 10,442	21,017
2003	3.629	5.207	5.34050	10,241	10,421	21,017
2004	3.618	5.215	5.34989	10,022	10,427	21,017
2005	3.620	5.218	5.36466	9,999	[R] 10,436	21,017
2006	3.605	5.218	5.35306	9,919	[R] 10,436	21,017
2007	3.591	5.219	5.34661	9,884	[R] 10,485	21,017
2008	3.600	5.218	5.33917	9,854	10,453	21,017

[a] This factor is not actually applied in SEDS but is displayed here for information.

[b] This factor is the average for electricity generated at U.S. fossil-fueled steam-electric plants. In SEDS, it is applied to convert hydroelectricity, electricity generated for distribution from wind, photovoltaic, and solar thermal energy. Through 2000, it is also used as the thermal conversion factor for wood and waste electricity net generation at electric utilities; beginning in 2001, Btu data for wood and biomass waste consumed by the electric power sector are available from surveys.

[c] There is a discontinuity in this time series between 1993 and 1994; beginning in 1994, the single constant factor is replaced by a factor that is a quantity-weighted average of motor gasoline's major components.

Where shown, R = Revised data, NA = Not available.

Sources: See source listing at the end of this appendix.

Table B2. Approximate Heat Content of Natural Gas Consumed by the Electric Power Sector, Selected Years, 1960-1998

(Thousand Btu per Cubic Foot)

State	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Alabama	1.03500	1.03400	1.03100	1.03300	1.13300	1.09900	1.02904	1.02310	1.02760	1.02950	1.03302
Alaska	– –	1.01000	1.00500	1.00600	1.00600	1.00600	1.02703	1.00343	1.00233	1.00242	1.00268
Arizona	1.03500	1.07600	1.05900	1.07100	1.05700	1.05900	1.03061	1.02137	1.01496	1.01378	1.01415
Arkansas	1.03500	1.00100	1.00400	1.01100	1.02600	1.05500	1.01765	1.01913	1.02344	1.02498	1.01929
California	1.03500	1.07300	1.05400	1.06300	1.05200	1.05100	1.03205	1.02831	1.02584	1.02032	1.02304
Colorado	1.03500	0.91200	0.97400	0.99600	0.98100	0.98900	1.04148	1.06306	1.12266	1.04229	1.06423
Connecticut	1.03500	1.02200	1.01600	1.00500	– –	1.03100	1.03057	R 1.02147	1.02345	1.02248	1.02601
Delaware	1.03500	1.04300	1.02000	1.07300	1.04200	1.03800	1.07008	R 1.03206	R 1.03420	R 1.03452	0.97091
District of Columbia	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Florida	1.03500	1.03700	1.04100	1.00900	1.01500	1.01100	1.01308	1.01396	1.01127	1.04256	1.04912
Georgia	1.03500	1.04000	1.03100	1.02900	1.03500	1.02400	R 1.02411	1.02690	1.02431	1.00946	1.02606
Hawaii	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Idaho	– –	– –	– –	1.05300	1.03700	1.04900	– –	– –	R 1.03541	R 1.03499	R 1.03000
Illinois	1.03500	1.02900	1.02500	1.02900	1.02400	1.02700	1.02323	1.01663	1.01965	1.01557	1.01928
Indiana	1.03500	0.99900	1.00600	1.00000	1.00400	1.00500	1.00251	1.02040	1.01995	1.02040	1.01648
Iowa	1.03500	1.01000	1.00900	1.00800	1.00800	1.02100	1.01396	1.00934	1.00500	1.00831	1.01268
Kansas	1.03500	0.99500	0.99800	0.99100	0.96000	0.96800	0.99773	0.98910	0.98351	0.98586	1.00521
Kentucky	1.03500	1.02800	1.01700	1.01700	1.02400	1.02400	1.02300	1.02032	1.01867	1.02012	1.02181
Louisiana	1.03500	1.04200	1.02900	1.05900	1.04100	1.04700	1.04485	1.04248	1.04232	1.03456	1.04232
Maine	– –	– –	– –	– –	– –	– –	R 1.01023	R 1.00909	1.00798	1.00656	1.03733
Maryland	1.03500	1.02500	1.02200	0.94300	1.02300	1.02500	1.03390	1.03470	1.02970	1.03684	1.03865
Massachusetts	1.03500	1.01300	1.01200	1.00200	1.00000	1.03900	1.04723	1.02632	1.02968	1.02836	1.04262
Michigan	1.03500	1.01400	1.01500	0.83400	0.73700	0.46000	0.81306	0.85452	0.87193	0.87129	0.88699
Minnesota	1.03500	0.99800	1.00200	0.98400	0.99400	1.00200	1.01509	1.01111	1.00989	1.01220	1.05067
Mississippi	1.03500	1.02900	1.02500	1.03000	1.01700	1.03900	1.03399	1.03375	1.03141	1.02934	1.03307
Missouri	1.03500	1.02000	1.00700	0.97700	0.97900	0.99200	1.01841	1.00814	1.01468	1.01471	1.01668
Montana	1.03500	1.00100	1.03200	1.14900	1.04900	1.20400	1.15891	1.03758	1.03955	1.02892	1.03493
Nebraska	1.03500	0.99100	1.00800	0.98200	0.95000	0.95700	0.95929	1.00724	1.01050	1.00967	1.00763
Nevada	1.03500	1.06200	1.08200	1.06700	1.07100	1.06500	R 1.03101	1.03278	1.03316	1.02715	1.03558
New Hampshire	– –	– –	– –	1.00000	– –	– –	– –	R 1.01847	1.02436	R 1.01700	1.02281
New Jersey	1.03500	1.04500	1.02600	1.02800	1.03400	1.04600	1.03553	1.03175	1.03056	1.03482	1.04144
New Mexico	1.03500	1.10800	1.08300	1.03300	1.02900	1.01300	1.03374	1.01865	0.99824	1.00067	0.99571
New York	1.03500	1.02600	1.02100	1.02500	1.03600	1.03500	1.03195	1.02207	1.02327	1.02371	1.02447
North Carolina	1.03500	1.03300	1.02400	1.03100	1.03400	1.03300	1.02675	1.02627	1.02727	1.02622	1.02605
North Dakota	1.03500	1.00000	1.03100	1.05400	1.05400	1.05400	1.03798	1.06620	1.05874	1.06653	– –
Ohio	1.03500	1.03300	1.02300	0.86400	1.00400	1.01400	1.01125	1.02324	1.02085	1.02017	1.02219
Oklahoma	1.03500	1.02600	1.03200	1.03800	1.04800	1.04400	1.04175	1.03384	1.02824	1.03153	1.02999
Oregon	1.03500	1.07000	1.04500	1.03700	0.99800	– –	1.02708	R 1.01079	1.01909	1.01602	1.01970
Pennsylvania	1.03500	1.03800	1.03300	1.00000	1.02000	1.00000	0.93491	1.02997	1.03198	1.02662	1.02931
Rhode Island	1.03500	1.04200	1.02100	1.04200	1.02200	1.03400	R 1.03209	R 1.02108	1.02322	1.01327	1.02253
South Carolina	1.03500	1.04200	1.02800	1.02800	1.03000	1.02900	1.02381	1.02322	1.02027	1.01971	1.03096
South Dakota	1.03500	0.99700	1.00400	1.00000	0.98800	1.01000	1.02803	1.01701	1.01705	1.01916	1.02159
Tennessee	1.03500	1.04600	1.02200	– –	1.01600	– –	1.02723	1.01900	1.01661	1.01905	1.02160
Texas	1.03500	1.03700	1.02700	1.01900	1.03700	1.03600	1.03509	1.02517	1.02413	1.02310	1.02420
Utah	1.03500	0.92500	0.93800	0.94100	0.95500	1.07500	1.02690	1.04876	1.01896	1.02582	1.03583
Vermont	– –	– –	– –	1.00000	1.00000	1.00000	1.02734	R 1.00079	1.01462	1.01156	R 1.01387
Virginia	1.03500	1.03100	1.02600	1.09800	1.10400	1.04000	1.03021	1.03249	1.03700	1.04719	1.03817
Washington	– –	– –	– –	– –	1.03000	1.03300	1.02854	1.02840	1.02830	1.02308	1.03466
West Virginia	1.03500	1.07100	1.02900	0.57500	1.00000	1.00000	R 1.00000	R 1.02782	1.01379	1.03654	1.00391
Wisconsin	1.03500	1.01800	1.01900	1.01600	1.00700	1.00000	1.01645	1.01529	1.01525	1.01687	1.01313
Wyoming	1.03500	0.92600	1.02300	0.84300	0.84700	1.04800	1.03513	R 1.04319	1.03950	1.04120	R 1.04402
U.S. Average	1.03500	1.03765	1.02944	1.02341	1.03313	1.03706	1.02725	1.02126	1.01968	1.02011	1.02380

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B3. Approximate Heat Content of Natural Gas Consumed by the Electric Power Sector, 1999-2008

(Thousand Btu per Cubic Foot)

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	1.02466	1.02720	1.03999	1.02482	R 1.02735	R 1.02490	1.02715	1.02886	1.03280	1.02817
Alaska	1.00220	1.00287	R 1.00408	R 1.00931	1.00443	1.00662	1.00565	1.00657	1.00661	1.00578
Arizona	1.01305	1.01636	1.02258	1.01840	1.00837	R 1.01981	1.02431	1.02054	1.02192	1.02732
Arkansas	1.02477	1.01993	R 1.03733	1.01635	1.03201	R 1.02981	1.02893	1.02800	1.02554	1.03182
California	1.02214	1.02000	1.02692	1.02158	1.02340	R 1.02943	1.02923	1.03244	1.03131	1.02863
Colorado	1.05450	1.05607	1.04663	1.01720	1.03365	R 1.04100	1.03495	1.03880	1.03756	1.03734
Connecticut	R 1.02435	1.01244	1.01368	R 1.02096	R 1.00753	R 1.01519	1.01130	1.00951	1.01186	1.01349
Delaware	R 0.98135	R 1.01667	1.03674	R 1.01702	R 1.04250	R 1.03234	1.03715	1.03675	1.03567	1.03416
District of Columbia	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Florida	1.04135	1.03646	1.04178	1.02549	1.03436	R 1.03106	1.03436	1.02849	1.02777	1.02853
Georgia	1.02673	1.01594	1.01916	R 1.02187	R 1.02437	R 1.03006	1.04566	1.04015	1.04010	1.03513
Hawaii	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Idaho	R 1.05000	R 1.04000	1.02873	R 0.97895	R 1.00233	R 1.02837	1.02118	1.02677	1.02491	1.01606
Illinois	1.02158	1.01971	1.02217	1.01163	R 1.01482	R 1.02479	1.02019	1.02249	1.02269	1.01906
Indiana	1.01879	1.01671	1.01952	R 1.02554	R 1.02143	R 1.01530	1.01773	1.01513	1.01438	1.01418
Iowa	1.00841	1.00859	R 1.01366	R 1.00652	R 1.01055	R 0.99858	1.00334	1.00438	1.00836	1.01045
Kansas	1.01066	1.01145	1.01026	R 1.00055	1.00340	R 1.00469	1.00872	1.01478	1.01988	1.01631
Kentucky	1.01939	1.01993	1.02461	R 1.02367	R 1.02339	R 1.02559	1.03241	1.02800	1.02683	1.02504
Louisiana	1.03837	1.03444	1.04067	1.02701	1.03237	R 1.02900	1.02964	1.03741	1.03258	1.03173
Maine	R 1.00113	R 1.02126	1.03355	1.03812	1.03671	R 1.03940	1.05201	1.05568	1.05798	1.05765
Maryland	1.03691	1.04123	1.03292	1.04258	R 1.03771	R 1.04042	1.04852	1.04652	1.04467	1.03151
Massachusetts	1.01500	1.03492	1.03677	1.01676	1.02782	R 1.03221	1.03287	1.03225	1.03655	1.03407
Michigan	0.89247	0.93402	R 0.98984	1.00796	1.01273	R 1.01718	1.01550	1.01063	1.01474	1.01457
Minnesota	1.01762	1.01789	1.02240	R 1.00549	R 1.00424	R 1.00642	1.00874	1.00680	1.00800	1.01323
Mississippi	1.02502	1.02791	1.02876	R 1.02547	R 1.03317	R 1.03223	1.03170	1.03232	1.03099	1.02441
Missouri	1.01323	1.01404	R 1.09902	R 1.00874	R 1.01643	R 1.02217	1.02147	1.02477	1.02310	1.01775
Montana	1.03116	1.01796	1.01456	R 1.00424	R 0.96097	R 1.01815	1.01286	1.01072	1.04481	1.02083
Nebraska	1.00966	1.01493	R 1.02166	R 0.97649	R 0.99665	R 0.98684	0.99775	1.00548	1.01590	1.00586
Nevada	1.04377	1.02377	1.02606	1.01984	1.02357	R 1.03028	1.03657	1.02932	1.02989	1.04160
New Hampshire	1.02137	R 1.06897	R 1.07395	R 1.04734	R 1.04563	R 1.04609	1.04446	1.04314	1.05527	1.04914
New Jersey	1.03534	1.03151	1.03223	1.03139	1.03536	R 1.03834	1.03463	1.03521	1.03452	1.03188
New Mexico	0.99600	0.99198	0.98219	R 1.00212	R 1.00030	R 1.02147	1.00549	1.00779	1.01786	1.01728
New York	1.02417	1.01798	1.01882	1.01869	1.02450	R 1.02161	1.02147	1.01924	1.02114	1.01970
North Carolina	1.02230	1.01722	R 1.02404	R 1.00970	R 1.00650	R 1.00925	1.01375	1.01299	1.01322	1.01147
North Dakota	– –	– –	1.02795	1.00955	1.02473	R 1.05000	1.11556	1.08016	1.08205	1.07724
Ohio	1.02092	1.01937	1.01881	R 1.02436	R 1.03350	R 1.02890	1.02907	1.03092	1.03230	1.03361
Oklahoma	1.02781	1.02916	1.03073	1.02546	1.02943	R 1.03132	1.03020	1.03032	1.02859	1.03282
Oregon	1.01631	1.01753	R 1.02083	R 1.01681	R 1.02119	R 1.02040	1.02003	1.02464	1.03321	1.02051
Pennsylvania	1.03645	1.03405	1.03347	R 1.02808	R 1.03904	R 1.03707	1.03585	1.03422	1.03028	1.03372
Rhode Island	1.01450	1.03065	1.03204	1.01847	1.02214	R 1.02100	1.02128	1.01687	1.02556	1.02043
South Carolina	1.06091	1.03751	1.03684	R 1.02819	R 1.02769	R 1.03375	1.03487	1.04906	1.03832	1.03597
South Dakota	1.01887	1.01954	R 1.02662	R 0.98021	R 0.96027	R 0.98334	1.00858	1.00539	1.00981	1.00587
Tennessee	1.02350	1.03286	R 1.03974	R 1.02305	1.03185	R 1.02562	1.02331	1.02767	1.02607	1.02797
Texas	1.02190	1.02101	1.03022	1.01876	1.02061	R 1.02274	1.02805	1.02568	1.02324	1.02265
Utah	1.03557	1.04434	R 1.04643	R 1.00534	1.00428	1.00032	1.04427	1.04983	1.04095	1.04876
Vermont	R 1.01200	R 1.01200	R 1.01200	1.01839	1.01936	1.02000	0.88972	1.01596	1.01826	1.00046
Virginia	1.03962	1.03747	1.02995	R 1.02431	1.02763	R 1.02690	1.03214	1.02936	1.02961	1.03997
Washington	1.03892	1.02537	1.02829	R 1.02601	R 1.02061	R 1.02441	1.02332	1.02568	1.02351	1.02966
West Virginia	R 1.00630	1.00560	1.02595	R 1.03648	R 1.05677	R 1.06013	1.03941	1.04647	1.04044	1.04295
Wisconsin	1.01690	1.01176	1.01630	R 0.97485	R 0.98648	R 0.99750	1.01029	1.01153	1.01693	1.01407
Wyoming	R 1.04402	1.02728	R 1.03070	R 0.92340	R 0.93450	R 0.94595	0.92542	0.99055	0.97678	0.97572
U.S. Average	1.02158	1.02139	1.02874	1.02070	1.02414	R 1.02651	1.02840	1.02760	1.02732	1.02714

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B4. Approximate Heat Content of Natural Gas Consumed by All Sectors Except Electric Power, Selected Years, 1960-1998

(Thousand Btu per Cubic Foot)

State	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Alabama	1.03500	1.03400	1.03100	1.02891	1.03349	1.03770	1.02900	1.02917	1.03313	1.04144	1.03955
Alaska	1.03500	1.01000	1.00500	1.00470	1.00231	1.00600	0.94586	1.00619	0.98908	0.99979	0.99874
Arizona	1.03500	1.07600	1.05900	1.04957	1.04558	1.04578	1.03233	1.03798	1.01012	1.02278	1.01667
Arkansas	1.03500	1.00100	1.00400	0.99503	0.99415	1.01677	1.00761	1.08447	1.02637	1.01395	1.02485
California	1.03500	1.07300	1.05400	1.05594	1.04358	1.03848	1.03198	1.01096	1.03426	1.01711	1.05636
Colorado	1.03500	0.91200	0.97400	0.89576	0.99471	0.99923	1.00299	1.01419	1.01517	1.00918	1.00627
Connecticut	1.03500	1.02200	1.01600	1.00500	1.02200	1.02998	1.03333	R 1.02969	1.02869	1.02792	1.02600
Delaware	1.03500	1.04300	1.02000	1.01468	1.03285	1.02197	1.00925	1.03556	R 1.03561	R 1.03525	1.06180
District of Columbia	1.03500	1.02400	1.01600	1.01200	1.00300	1.01500	1.00800	1.00600	1.00900	1.02100	1.02700
Florida	1.03500	1.03700	1.04100	1.07754	1.06968	1.10911	1.08380	1.06972	1.11625	1.05806	1.05438
Georgia	1.03500	1.04000	1.03100	1.02672	1.03196	1.02801	1.02702	1.02597	1.02298	1.02784	1.02709
Hawaii	– –	– –	– –	– –	0.96300	1.08200	1.07000	1.04800	1.05700	1.03000	1.05600
Idaho	1.03500	1.06500	1.06100	1.05500	1.05301	1.04900	1.02800	1.03000	1.02999	R 1.03089	1.03821
Illinois	1.03500	1.02900	1.02500	1.02590	1.02196	1.04008	1.02199	1.02013	1.01898	1.02124	1.02217
Indiana	1.03500	0.99900	1.00600	0.98976	0.98894	1.00801	1.01823	1.01187	1.01093	1.01092	1.01701
Iowa	1.03500	1.01000	1.00900	1.00800	1.00287	1.01091	1.00687	1.00492	1.00601	1.00901	1.01096
Kansas	1.03500	0.99500	0.99800	0.98159	0.99404	0.99990	0.99911	1.00306	0.99685	1.00225	0.99370
Kentucky	1.03500	1.02800	1.01700	1.00799	1.00886	1.03004	1.04003	1.09629	1.04924	1.05029	1.03435
Louisiana	1.03500	1.04200	1.02900	1.03153	1.03707	1.03819	1.04137	1.03321	1.04431	1.13486	1.07709
Maine	– –	– –	1.01200	1.02400	1.02400	1.03500	R 1.00477	R 1.01613	1.01607	1.01405	1.01681
Maryland	1.03500	1.02500	1.02200	1.01323	1.01990	1.03408	1.02720	1.02506	1.02895	1.03378	1.03679
Massachusetts	1.03500	1.01300	1.01200	1.00402	1.01646	1.02388	1.03523	1.02584	1.02600	1.01939	1.01524
Michigan	1.03500	1.01400	1.01500	1.02420	1.01961	1.02304	1.04436	1.04042	1.03412	1.04030	1.04705
Minnesota	1.03500	0.99800	1.00200	1.00225	0.99709	1.00401	1.00379	1.01305	1.01812	1.01810	1.01875
Mississippi	1.03500	1.02900	1.02500	1.02189	1.03421	1.02459	1.03266	1.02111	1.02937	1.03587	1.05199
Missouri	1.03500	1.02000	1.00700	1.00822	1.01577	1.01714	1.01089	1.00695	1.01093	1.00987	1.01062
Montana	1.03500	1.00100	1.03200	1.01927	1.00926	0.99897	1.02672	1.02995	1.02993	1.03101	1.02592
Nebraska	1.03500	0.99100	1.00800	0.99650	0.98019	0.98226	0.98383	0.97938	1.00694	0.99776	1.00281
Nevada	1.03500	1.06200	1.08200	1.06700	1.05209	1.06122	R 1.03099	1.03329	1.03993	1.02680	1.04807
New Hampshire	1.03500	1.01200	1.01000	1.01024	1.02000	1.02700	1.01400	R 1.01005	1.01900	R 1.01083	1.01091
New Jersey	1.03500	1.04500	1.02600	1.03111	1.03269	1.02214	1.02434	1.03463	1.03722	1.03504	1.03715
New Mexico	1.03500	1.10800	1.08300	1.07555	1.04776	1.08795	1.05642	1.02024	1.03464	1.02240	0.97888
New York	1.03500	1.02600	1.02100	1.01476	1.02277	1.02724	1.02930	1.03108	1.02699	1.02704	1.02956
North Carolina	1.03500	1.03300	1.02400	1.01799	1.01175	1.03400	1.03209	1.03319	1.03615	1.03628	1.04095
North Dakota	1.03500	1.00000	1.03100	1.00077	1.05200	1.06200	1.03200	1.05000	1.05100	1.05000	1.03800
Ohio	1.03500	1.03300	1.02300	1.02403	1.01606	1.04403	1.04005	1.03812	1.03805	1.04510	1.04018
Oklahoma	1.03500	1.02600	1.03200	0.99619	1.00198	1.01970	1.02103	1.01462	1.02259	1.00586	1.00666
Oregon	1.03500	1.07000	1.04500	1.03900	1.04620	1.03000	1.02270	1.04450	1.04356	1.05050	1.04997
Pennsylvania	1.03500	1.03800	1.03300	1.02505	1.02201	1.03409	1.03938	1.03528	1.03407	1.03525	1.03633
Rhode Island	1.03500	1.04200	1.02100	1.01399	1.02094	1.03291	1.02678	R 1.02871	1.09977	1.03591	1.02711
South Carolina	1.03500	1.04200	1.02800	1.02346	1.03312	1.02800	1.02824	1.02717	1.03008	1.03120	1.03418
South Dakota	1.03500	0.99700	1.00400	1.00000	0.99811	1.01000	1.01589	1.01392	1.01394	1.01794	1.00890
Tennessee	1.03500	1.04600	1.02200	1.03100	1.01600	1.03400	1.03502	1.03110	1.03203	1.03107	1.03019
Texas	1.03500	1.03700	1.02700	1.02966	1.03085	1.03909	1.04215	1.04232	1.03666	1.03009	1.04975
Utah	1.03500	0.92500	0.93800	0.95023	1.09212	1.07500	1.08848	1.06384	1.04260	1.04241	1.04637
Vermont	– –	– –	1.00600	1.00930	0.98936	0.99185	0.98245	R 0.99591	1.01500	1.01200	R 1.01195
Virginia	1.03500	1.03100	1.02600	1.01868	1.01471	1.03899	1.04266	1.03071	1.03928	1.04374	1.04382
Washington	1.03500	1.07500	1.05500	1.04200	1.05216	1.04000	1.03000	1.04218	1.03856	1.04878	1.04667
West Virginia	1.03500	1.07100	1.02900	1.03805	1.03201	1.06707	R 1.07108	1.06116	1.06110	1.06811	1.06321
Wisconsin	1.03500	1.01800	1.01900	1.02023	1.00804	1.01004	1.00591	1.01089	1.01296	1.01076	1.01085
Wyoming	1.03500	0.92600	1.02300	0.93453	1.06069	1.05100	1.09905	1.06303	1.06102	1.06903	1.06706
U.S. Average	1.03500	1.03182	1.02543	1.02232	1.02375	1.03156	1.03079	1.02981	1.03076	1.03524	1.03740

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B5. Approximate Heat Content of Natural Gas Consumed by All Sectors Except Electric Power, 1999-2008

(Thousand Btu per Cubic Foot)

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	1.03584	1.04401	1.03244	R 1.02934	R 1.02954	R 1.02504	R 1.02978	R 1.02749	1.02112	1.02288
Alaska	0.99983	0.76085	1.01051	R 1.00357	R 1.00396	R 1.00373	R 1.00384	R 1.00479	1.00480	1.00603
Arizona	1.01596	1.01006	1.00624	R 1.01745	R 1.01270	R 1.01722	R 1.02335	R 1.01878	1.02568	1.02621
Arkansas	1.01791	1.01885	1.01324	R 1.02441	R 1.03070	R 1.00914	R 1.00956	R 1.03087	0.99976	1.00868
California	1.01470	0.95633	1.01548	R 1.01926	R 1.01992	R 1.01997	R 1.02313	R 1.02279	1.01242	1.02920
Colorado	1.00036	0.99802	1.00535	R 1.00732	R 1.00973	R 1.00646	R 1.02754	R 1.03023	1.01694	1.01537
Connecticut	1.02391	1.02845	1.02306	R 1.02418	R 1.02614	R 1.02429	R 1.02534	R 1.02646	1.02901	1.02049
Delaware	R 1.06761	R 1.04125	1.03282	R 1.03652	R 1.03781	R 1.03599	1.03694	R 1.03707	1.03891	1.03395
District of Columbia	1.02100	1.02700	1.02600	1.02400	1.02700	1.02700	1.05200	1.02500	1.02700	1.02800
Florida	1.04611	1.10825	1.06501	R 1.03582	R 1.04167	R 1.03571	R 1.03773	R 1.03152	1.08009	1.03157
Georgia	1.02703	1.01823	1.03452	R 1.02554	R 1.02943	R 1.02886	R 1.03516	R 1.02961	1.02477	1.02462
Hawaii	1.05500	1.04700	1.03600	1.06000	1.04700	1.04800	1.03700	1.04700	1.03700	1.04300
Idaho	R 1.03770	1.02464	1.01754	R 1.02994	R 1.03093	R 1.04099	R 1.05286	1.04651	1.02384	1.02531
Illinois	1.02202	1.02211	1.01989	R 1.01312	R 1.01501	R 1.01364	1.01467	1.01567	1.01340	1.01382
Indiana	1.01798	1.02522	1.02416	R 1.00678	R 1.09050	R 1.00871	1.01802	1.01711	1.02366	1.01292
Iowa	1.01925	1.00493	1.00375	R 1.00292	R 1.00286	R 1.00317	1.00626	R 1.01268	R 1.01016	1.00997
Kansas	0.99516	1.00759	1.00451	R 1.00856	R 1.01247	R 1.01335	1.01431	R 1.01939	1.01782	1.03584
Kentucky	1.03234	1.04038	1.03727	R 1.03679	R 1.03723	R 1.03521	1.02873	1.02906	1.02702	1.03544
Louisiana	1.04300	1.06383	1.02388	R 1.03217	R 1.03192	R 1.03267	R 1.04416	1.03811	1.03308	1.03572
Maine	R 1.01944	R 1.15291	1.17664	R 1.04642	R 1.04570	R 1.04407	R 1.04565	R 1.05204	R 1.10044	1.06847
Maryland	1.03362	1.03286	1.03744	R 1.03629	R 1.03802	R 1.03677	1.04794	R 1.03684	1.03601	1.03762
Massachusetts	1.06021	1.04444	1.04537	R 1.03497	R 1.02813	R 1.02838	R 1.01466	R 1.00974	R 1.00836	1.01516
Michigan	1.04155	1.03633	1.03105	R 1.02097	R 1.02992	R 1.02516	R 1.01492	R 1.01800	R 1.02451	1.02415
Minnesota	1.01905	1.01492	1.01167	R 1.00706	R 1.00818	R 1.00702	1.01225	R 1.01670	1.02118	1.02365
Mississippi	1.04182	1.04308	1.02193	R 1.03602	R 1.03604	R 1.02863	1.02861	R 1.02439	1.02900	1.02742
Missouri	1.01298	1.01512	1.00628	R 1.01240	R 1.01378	R 1.01978	1.01980	1.02044	1.01827	1.00517
Montana	1.02397	1.02402	1.02202	R 1.02103	R 1.02324	R 1.02602	1.04008	1.01705	1.01560	1.01597
Nebraska	0.99858	1.00455	1.01683	R 1.00831	R 1.00742	R 1.00966	R 1.00982	R 1.01242	R 1.01816	1.01123
Nevada	1.02043	1.02996	1.02332	R 1.03344	R 1.03535	R 1.03226	R 1.04352	R 1.03740	R 1.04863	1.03340
New Hampshire	1.00864	1.05764	R 1.06172	R 1.05012	R 1.04005	R 1.04325	1.02018	R 1.01914	1.01423	1.01963
New Jersey	1.03990	1.03601	1.03840	R 1.03905	R 1.03871	R 1.03919	R 1.04015	R 1.03625	1.03516	1.03343
New Mexico	0.97522	0.96773	0.97338	R 0.97226	R 1.02286	R 1.02556	R 1.02456	R 1.02137	R 1.03022	1.01689
New York	1.02845	1.03229	1.03347	R 1.02489	R 1.02778	R 1.02735	R 1.02638	R 1.02196	R 1.02550	1.02167
North Carolina	1.03577	1.03075	1.04244	R 1.03665	R 1.04235	R 1.03550	R 1.03670	R 1.03477	1.03703	1.02970
North Dakota	1.04500	1.03500	1.02900	R 1.00300	R 1.00900	R 1.02100	1.03600	1.04400	1.04700	1.04200
Ohio	1.03722	1.04226	1.04231	R 1.03838	R 1.03606	R 1.04536	R 1.04349	1.03926	1.03723	1.04020
Oklahoma	1.02064	1.00814	1.02651	R 1.02958	R 1.03033	R 1.03081	R 1.02986	R 1.03335	1.06474	1.03140
Oregon	1.06029	1.03123	R 1.02890	R 1.02536	R 1.00705	R 1.00851	R 1.03607	R 1.03575	1.01946	1.02491
Pennsylvania	1.03598	1.03503	1.05476	R 1.03772	R 1.04006	R 1.03924	1.04055	R 1.03868	1.04106	1.03899
Rhode Island	1.03037	1.04690	1.02937	R 1.03022	R 1.02614	R 1.02694	R 1.02067	R 1.01716	R 1.04105	1.02183
South Carolina	1.02895	1.02852	1.03810	R 1.03294	R 1.03684	R 1.03529	R 1.03775	R 1.03780	1.03646	1.03327
South Dakota	1.00502	1.00347	R 0.99519	R 0.99959	R 1.00322	R 1.00278	1.00686	1.00279	1.00242	1.00392
Tennessee	1.02708	1.03708	1.03697	R 1.03209	R 1.03303	R 1.03307	1.03529	1.03832	1.03944	1.03718
Texas	1.03769	1.03343	1.02371	R 1.03316	R 1.02899	R 1.03089	1.02796	1.02623	1.03139	1.02659
Utah	1.05582	1.05145	R 1.05259	R 1.06018	R 1.06688	R 1.05639	R 1.05372	R 1.05713	1.06255	1.06236
Vermont	R 1.01200	R 1.01200	R 1.01200	1.00394	1.00595	1.00391	1.00444	1.00094	1.00095	1.00502
Virginia	1.03772	1.03461	1.03814	R 1.03552	R 1.03730	R 1.03066	R 1.04226	R 1.03531	1.04410	1.03732
Washington	1.05368	1.04243	1.03480	R 1.02961	R 1.02633	R 1.02787	R 1.02955	R 1.02995	1.02666	1.03011
West Virginia	R 1.05517	1.06822	1.06778	R 1.06233	R 1.06615	R 1.05798	R 1.06755	R 1.11936	R 1.07412	1.07454
Wisconsin	1.01171	1.00990	1.00852	R 1.00881	R 1.00940	R 1.00756	1.01345	1.01093	1.01354	1.01399
Wyoming	1.05101	1.04635	1.05569	R 1.04402	R 1.04641	R 1.04549	R 1.04262	R 1.04139	R 1.03889	1.03142
U.S. Average	1.02937	1.01978	1.02624	R 1.02521	R 1.02864	R 1.02602	R 1.02791	R 1.02723	R 1.02739	1.02654

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B6. Approximate Heat Content of Natural Gas Total Consumption, Selected Years, 1960-1998

(Thousand Btu per Cubic Foot)

State	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Alabama	1.03500	1.03400	1.03100	1.02900	1.03400	1.03800	1.02900	1.02900	1.03300	1.04100	1.03900
Alaska	1.03500	1.01000	1.00500	1.00500	1.00300	1.00600	0.95400	1.00600	0.99000	1.00000	0.99900
Arizona	1.03500	1.07600	1.05900	1.05200	1.04900	1.05000	1.03200	1.03500	1.01100	1.02100	1.01600
Arkansas	1.03500	1.00100	1.00400	0.99700	1.00100	1.01900	1.00900	1.07600	1.02600	1.01500	1.02400
California	1.03500	1.07300	1.05400	1.05700	1.04600	1.04300	1.03200	1.01600	1.03200	1.01800	1.04700
Colorado	1.03500	0.91200	0.97400	0.91300	0.99300	0.99900	1.00500	1.01800	1.02400	1.01200	1.01200
Connecticut	1.03500	1.02200	1.01600	1.00500	1.02200	1.03000	1.03300	1.02800	1.02800	1.02700	1.02600
Delaware	1.03500	1.04300	1.02000	1.02000	1.03500	1.02500	1.02600	1.03400	1.03500	1.03500	1.03700
District of Columbia	1.03500	1.02400	1.01600	1.01200	1.00300	1.01500	1.00800	1.00600	1.00900	1.02100	1.02700
Florida	1.03500	1.03700	1.04100	1.04300	1.04100	1.05300	1.04300	1.03300	1.05000	1.04800	1.05100
Georgia	1.03500	1.04000	1.03100	1.02700	1.03200	1.02800	1.02700	1.02600	1.02300	1.02700	1.02700
Hawaii	1.03500	– –	0.96200	0.94700	0.96300	1.08200	1.07000	1.04800	1.05700	1.03000	1.05600
Idaho	1.03500	1.06500	1.06100	1.05500	1.05300	1.04900	1.02800	1.03000	1.03000	1.03100	1.03800
Illinois	1.03500	1.02900	1.02500	1.02600	1.02200	1.04000	1.02200	1.02000	1.01900	1.02100	1.02200
Indiana	1.03500	0.99900	1.00600	0.99000	0.98900	1.00800	1.01800	1.01200	1.01100	1.01100	1.01700
Iowa	1.03500	1.01000	1.00900	1.00800	1.00300	1.01100	1.00700	1.00500	1.00600	1.00900	1.01100
Kansas	1.03500	0.99500	0.99800	0.98400	0.98700	0.99800	0.99900	1.00200	0.99600	1.00100	0.99500
Kentucky	1.03500	1.02800	1.01700	1.00800	1.00900	1.03000	1.04000	1.09600	1.04900	1.05000	1.03400
Louisiana	1.03500	1.04200	1.02900	1.03700	1.03800	1.04000	1.04200	1.03500	1.04400	1.11800	1.07000
Maine	1.03500	– –	1.01200	1.02400	1.02400	1.03500	1.00500	1.01600	1.01600	1.01400	1.01700
Maryland	1.03500	1.02500	1.02200	1.01300	1.02000	1.03400	1.02800	1.02600	1.02900	1.03400	1.03700
Massachusetts	1.03500	1.01300	1.01200	1.00400	1.01600	1.02700	1.03800	1.02600	1.02700	1.02200	1.02300
Michigan	1.03500	1.01400	1.01500	1.01200	1.01100	1.01500	1.02200	1.01700	1.01200	1.01600	1.02000
Minnesota	1.03500	0.99800	1.00200	1.00100	0.99700	1.00400	1.00400	1.01300	1.01800	1.01800	1.02000
Mississippi	1.03500	1.02900	1.02500	1.02300	1.02800	1.02800	1.03300	1.02600	1.03000	1.03400	1.04600
Missouri	1.03500	1.02000	1.00700	1.00600	1.01400	1.01700	1.01100	1.00700	1.01100	1.01000	1.01100
Montana	1.03500	1.00100	1.03200	1.02100	1.01200	1.00100	1.02800	1.03000	1.03000	1.03100	1.02600
Nebraska	1.03500	0.99100	1.00800	0.99400	0.97800	0.98200	0.98300	0.98000	1.00700	0.99800	1.00300
Nevada	1.03500	1.06200	1.08200	1.06700	1.06100	1.06200	1.03100	1.03300	1.03600	1.02700	1.04100
New Hampshire	1.03500	1.01200	1.01000	1.01000	1.02000	1.02700	1.01400	1.01100	1.01900	1.01100	1.01100
New Jersey	1.03500	1.04500	1.02600	1.03100	1.03300	1.02600	1.02600	1.03400	1.03600	1.03500	1.03800
New Mexico	1.03500	1.10800	1.08300	1.06400	1.04300	1.07400	1.05400	1.02000	1.02900	1.01900	0.98200
New York	1.03500	1.02600	1.02100	1.01500	1.02500	1.02900	1.03000	1.02800	1.02600	1.02600	1.02800
North Carolina	1.03500	1.03300	1.02400	1.01800	1.01200	1.03400	1.03200	1.03300	1.03600	1.03600	1.04000
North Dakota	1.03500	1.00000	1.03100	1.00100	1.05200	1.06200	1.03200	1.05000	1.05100	1.05000	1.03800
Ohio	1.03500	1.03300	1.02300	1.02300	1.01600	1.04400	1.04000	1.03800	1.03800	1.04500	1.04000
Oklahoma	1.03500	1.02600	1.03200	1.01500	1.02300	1.02800	1.02700	1.02000	1.02400	1.01200	1.01400
Oregon	1.03500	1.07000	1.04500	1.03900	1.04600	1.03000	1.02300	1.04000	1.04000	1.04600	1.04300
Pennsylvania	1.03500	1.03800	1.03300	1.02500	1.02200	1.03400	1.03700	1.03500	1.03400	1.03500	1.03600
Rhode Island	1.03500	1.04200	1.02100	1.01400	1.02100	1.03300	1.02800	1.02600	1.06000	1.02400	1.02500
South Carolina	1.03500	1.04200	1.02800	1.02400	1.03300	1.02800	1.02800	1.02700	1.03000	1.03100	1.03400
South Dakota	1.03500	0.99700	1.00400	1.00000	0.99800	1.01000	1.01600	1.01400	1.01400	1.01800	1.01000
Tennessee	1.03500	1.04600	1.02200	1.03100	1.01600	1.03400	1.03500	1.03100	1.03200	1.03100	1.03000
Texas	1.03500	1.03700	1.02700	1.02600	1.03300	1.03800	1.04000	1.03700	1.03300	1.02800	1.04100
Utah	1.03500	0.92500	0.93800	0.95000	1.08600	1.07500	1.08800	1.06300	1.04200	1.04200	1.04600
Vermont	1.03500	– –	1.00600	1.00800	0.99000	0.99200	0.98700	0.99600	1.01500	1.01200	1.01200
Virginia	1.03500	1.03100	1.02600	1.01900	1.01600	1.03900	1.04200	1.03100	1.03900	1.04400	1.04300
Washington	1.03500	1.07500	1.05500	1.04200	1.05200	1.04000	1.03000	1.04000	1.03700	1.04600	1.04500
West Virginia	1.03500	1.07100	1.02900	1.03700	1.03200	1.06700	1.07100	1.06100	1.06100	1.06800	1.06300
Wisconsin	1.03500	1.01800	1.01900	1.02000	1.00800	1.01000	1.00600	1.01100	1.01300	1.01100	1.01100
Wyoming	1.03500	0.92600	1.02300	0.93400	1.06000	1.05100	1.09900	1.06300	1.06100	1.06900	1.06700
U.S. Average	1.03500	1.03271	1.02618	1.02249	1.02549	1.03253	1.03019	1.02818	1.02890	1.03254	1.03460

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B7. Approximate Heat Content of Natural Gas Total Consumption, 1999-2008

(Thousand Btu per Cubic Foot)

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	1.03500	1.04200	1.03400	R 1.02800	R 1.02900	R 1.02500	R 1.02900	R 1.02800	1.02600	1.02500
Alaska	1.00000	0.78100	1.01000	R 1.00400	R 1.00400	R 1.00400	R 1.00400	R 1.00500	1.00500	1.00600
Arizona	1.01500	1.01300	1.01500	R 1.01800	R 1.01000	R 1.01900	R 1.02400	R 1.02000	1.02300	1.02700
Arkansas	1.01900	1.01900	1.01600	R 1.02300	R 1.03100	R 1.01300	R 1.01400	R 1.03000	1.00700	1.01500
California	1.01700	0.97900	1.02000	R 1.02000	R 1.02100	R 1.02300	R 1.02500	R 1.02600	1.01900	1.02900
Colorado	1.00700	1.00800	1.01300	R 1.00900	R 1.01400	R 1.01300	R 1.02900	R 1.03200	1.02200	1.02000
Connecticut	1.02400	1.02500	1.02100	R 1.02300	R 1.02100	R 1.02100	R 1.02000	R 1.01900	1.02200	1.01800
Delaware	1.03700	1.03700	1.03400	R 1.03000	R 1.03900	R 1.03500	1.03700	R 1.03700	1.03800	1.03400
District of Columbia	1.02100	1.02700	1.02600	1.02400	1.02700	1.02700	1.05200	1.02500	1.02700	1.02800
Florida	1.04300	1.06000	1.04900	R 1.02800	R 1.03600	R 1.03200	R 1.03500	R 1.02900	1.03600	1.02900
Georgia	1.02700	1.01800	1.03300	R 1.02500	R 1.02900	R 1.02900	R 1.03700	R 1.03200	1.02900	1.02700
Hawaii	1.05500	1.04700	1.03600	1.06000	1.04700	1.04800	1.03700	1.04700	1.03700	1.04300
Idaho	1.03800	1.02500	1.01900	R 1.02800	R 1.02700	R 1.03900	R 1.04800	1.04400	1.02400	1.02400
Illinois	1.02200	1.02200	1.02000	R 1.01300	R 1.01500	R 1.01400	1.01500	1.01600	1.01400	1.01400
Indiana	1.01800	1.02500	1.02400	R 1.00800	R 1.08700	R 1.00900	1.01800	1.01700	1.02300	1.01300
Iowa	1.01900	1.00500	1.00400	R 1.00300	R 1.00300	R 1.00300	1.00600	R 1.01200	1.01000	1.01000
Kansas	0.99700	1.00800	1.00500	R 1.00800	R 1.01200	R 1.01300	1.01400	R 1.01900	1.01800	1.03400
Kentucky	1.03200	1.04000	1.03700	R 1.03600	R 1.03700	R 1.03500	1.02900	1.02900	1.02700	1.03500
Louisiana	1.04200	1.05800	1.02700	R 1.03100	R 1.03200	R 1.03200	R 1.04100	1.03800	1.03300	1.03500
Maine	1.01800	1.07300	1.05700	R 1.03900	R 1.03800	R 1.04000	R 1.05100	R 1.05500	1.07500	1.06200
Maryland	1.03400	1.03400	1.03700	R 1.03700	R 1.03800	R 1.03700	1.04800	R 1.03800	1.03700	1.03700
Massachusetts	1.04800	1.04200	1.04300	R 1.02900	R 1.02800	R 1.03000	R 1.02200	R 1.02000	1.02100	1.02300
Michigan	1.01800	1.02200	1.02500	R 1.01900	R 1.02800	R 1.02400	R 1.01500	R 1.01700	1.02300	1.02300
Minnesota	1.01900	1.01500	1.01200	R 1.00700	R 1.00800	R 1.00700	1.01200	R 1.01600	1.02000	1.02300
Mississippi	1.03600	1.03800	1.02500	R 1.03100	R 1.03500	R 1.03000	1.03000	R 1.02800	1.03000	1.02600
Missouri	1.01300	1.01500	1.01700	R 1.01200	R 1.01400	R 1.02000	1.02000	1.02100	1.01900	1.00700
Montana	1.02400	1.02400	1.02200	R 1.02100	R 1.02300	R 1.02600	1.04000	1.01700	1.01600	1.01600
Nebraska	0.99900	1.00500	1.01700	R 1.00700	R 1.00700	R 1.00900	R 1.00900	R 1.01200	1.01800	1.01100
Nevada	1.03400	1.02600	1.02500	R 1.02500	R 1.02800	R 1.03100	R 1.03900	R 1.03200	1.03600	1.03900
New Hampshire	1.00900	1.05800	1.06200	R 1.05000	R 1.04300	R 1.04500	1.03600	R 1.03500	1.04000	1.04000
New Jersey	1.03900	1.03500	1.03700	R 1.03700	R 1.03800	1.03900	R 1.03900	R 1.03600	1.03500	1.03300
New Mexico	0.97900	0.97200	0.97500	R 0.97700	R 1.01900	R 1.02500	R 1.02100	R 1.01800	1.02700	1.01700
New York	1.02700	1.02800	1.02900	R 1.02300	R 1.02700	R 1.02600	R 1.02500	R 1.02100	1.02400	1.02100
North Carolina	1.03500	1.03000	1.04100	R 1.03300	R 1.04000	R 1.03300	R 1.03400	R 1.03200	1.03300	1.02700
North Dakota	1.04500	1.03500	1.02900	R 1.00300	R 1.00900	R 1.02100	1.03600	1.04400	1.04700	1.04200
Ohio	1.03700	1.04200	1.04200	R 1.03800	R 1.03600	R 1.04500	R 1.04300	1.03900	1.03700	1.04000
Oklahoma	1.02300	1.01500	1.02800	R 1.02800	R 1.03000	R 1.03100	R 1.03000	R 1.03200	1.04900	1.03200
Oregon	1.05100	1.02700	1.02600	R 1.02300	R 1.01200	R 1.01300	R 1.03000	R 1.03200	1.02500	1.02300
Pennsylvania	1.03600	1.03500	1.05400	R 1.03700	R 1.04000	R 1.03900	1.04000	R 1.03800	1.03900	1.03800
Rhode Island	1.02300	1.03800	1.03100	R 1.02300	R 1.02400	R 1.02400	R 1.02100	R 1.01700	1.03200	1.02100
South Carolina	1.03100	1.02900	1.03800	R 1.03200	R 1.03600	R 1.03500	R 1.03700	R 1.04100	1.03700	1.03400
South Dakota	1.00600	1.00500	0.99900	R 0.99900	R 1.00100	R 1.00200	1.00700	1.00300	1.00300	1.00400
Tennessee	1.02700	1.03700	1.03700	R 1.03200	R 1.03300	R 1.03300	1.03500	1.03800	1.03900	1.03700
Texas	1.03200	1.02900	1.02600	R 1.02800	R 1.02600	R 1.02800	1.02800	1.02600	1.02800	1.02500
Utah	1.05500	1.05100	1.05200	R 1.05500	R 1.06100	R 1.05300	R 1.05300	R 1.05600	1.05700	1.05900
Vermont	1.01200	1.01200	1.01200	1.00400	1.00600	1.00400	1.00400	1.00100	1.00100	1.00500
Virginia	1.03800	1.03500	1.03700	R 1.03400	R 1.03600	R 1.03000	R 1.04000	R 1.03400	1.04000	1.03800
Washington	1.05200	1.03800	1.03300	R 1.02900	R 1.02500	R 1.02700	R 1.02800	R 1.02900	1.02600	1.03000
West Virginia	1.05500	1.06800	1.06700	R 1.06200	R 1.06600	R 1.05800	R 1.06700	R 1.11700	1.07300	1.07400
Wisconsin	1.01200	1.01000	1.00900	R 1.00700	R 1.00800	R 1.00700	1.01300	1.01100	1.01400	1.01400
Wyoming	1.05100	1.04600	1.05500	R 1.04000	R 1.04400	R 1.04500	R 1.04200	R 1.04100	1.03800	1.03100
U.S. Average	1.02770	1.02014	1.02684	R 1.02410	R 1.02760	R 1.02614	R 1.02804	R 1.02733	R 1.02737	1.02671

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B8. Approximate Heat Content of Coal Consumed by the Residential and Commercial Sector, Selected Years, 1960-1998

(Million Btu per Short Ton)

State	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Alabama	24.90955	24.77905	23.93285	23.51979	24.04242	24.40711	24.62888	24.64589	24.63827	24.64215	25.47588
Alaska	18.90636	18.80731	18.16504	17.68304	– –	15.80000	15.80000	15.80000	15.80000	15.84800	15.71000
Arizona	– –	– –	– –	– –	– –	19.78800	18.69794	21.96150	19.28500	19.10306	21.69872
Arkansas	– –	– –	– –	– –	23.89952	22.99046	24.83396	– –	– –	24.49708	25.08934
California	23.01295	22.89238	22.11061	– –	23.10930	23.55520	23.18400	23.29600	23.28200	23.10055	23.62691
Colorado	22.95289	22.83264	22.05291	20.82582	21.46057	21.21743	21.43489	22.16939	22.10652	18.71008	22.43624
Connecticut	24.86790	24.40178	23.47600	22.27200	22.71900	23.03100	25.19900	23.80410	24.63800	24.49700	27.35000
Delaware	24.72100	24.31600	23.47600	22.27200	23.14289	24.11686	24.85615	24.69600	24.93390	25.05444	26.90254
District of Columbia	25.10862	24.97707	24.12411	23.24075	24.54122	24.88768	24.96081	25.17800	24.74271	24.57946	25.31000
Florida	– –	– –	– –	– –	24.28341	24.88200	24.86125	24.64400	25.04400	– –	26.04235
Georgia	24.74225	24.61262	23.77210	23.49417	24.32123	24.83223	25.14330	24.98009	25.04400	25.69800	25.65432
Hawaii	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Idaho	24.83140	24.70130	23.85776	22.66294	22.29152	22.83215	22.47778	21.71685	21.72486	22.68311	19.71901
Illinois	24.04164	23.91539	23.09871	22.52260	22.06925	22.26944	22.45162	22.51632	22.68127	22.80243	21.96000
Indiana	24.06516	23.93847	23.12085	22.13233	21.88129	22.25860	22.46054	22.29025	22.23182	22.19420	22.75000
Iowa	21.32126	21.20956	20.48526	18.27722	20.22308	21.40188	23.96001	24.36084	24.52912	23.56166	24.41000
Kansas	21.78815	21.67400	20.93384	– –	21.18218	21.14600	24.27951	23.94481	24.10800	22.52800	24.68789
Kentucky	24.43091	24.28447	23.45391	23.17784	23.83696	24.34440	24.45011	24.92797	24.35637	23.26395	25.46950
Louisiana	– –	– –	– –	– –	21.36502	– –	– –	25.07800	– –	24.53000	– –
Maine	24.96425	24.70177	23.61235	22.51890	23.54561	24.27817	24.93701	24.69600	24.63800	24.49700	26.34731
Maryland	25.03270	24.87495	23.94377	22.93823	24.04282	24.74887	25.06708	24.83796	25.08097	25.13840	25.31044
Massachusetts	24.89361	24.49344	23.55718	22.43028	23.41739	23.77832	25.07028	24.83425	24.79549	24.70762	27.34861
Michigan	24.75940	24.62836	23.78687	23.46574	24.35257	24.46038	24.81175	24.66160	24.84902	24.59315	24.80000
Minnesota	21.97087	21.85576	21.10939	19.25676	20.82860	19.14210	17.89230	20.25825	17.54796	18.40880	19.25179
Mississippi	– –	– –	– –	– –	22.99343	24.54115	24.85200	– –	– –	24.49708	– –
Missouri	22.94167	22.82147	22.04212	21.40447	21.80697	22.80191	21.93585	22.63423	22.66103	22.82574	22.00000
Montana	21.33557	21.22380	20.49901	20.38911	22.04235	17.68025	18.78135	21.22785	18.18800	17.85986	23.37560
Nebraska	20.91322	20.80366	20.09322	18.40616	18.03826	21.52621	21.37396	20.32116	24.63800	17.33200	20.74919
Nevada	25.11444	25.04926	24.21082	23.32668	22.43015	23.56200	24.01028	23.44269	23.28200	23.09600	22.98804
New Hampshire	24.72100	24.31600	23.47600	22.27200	22.71900	23.03100	25.17092	24.86761	24.84196	24.55195	27.35000
New Jersey	24.72427	24.35398	23.48102	22.26344	22.71900	23.21834	25.17308	24.69600	24.63800	24.49700	25.22885
New Mexico	22.99301	22.87255	22.09147	– –	19.78553	19.81693	18.69800	19.23183	19.32888	18.92150	24.76400
New York	24.70038	24.36019	23.49620	22.57414	23.33679	23.81886	24.85588	24.95806	24.82789	24.83757	25.45000
North Carolina	24.76213	24.63240	23.79120	23.49258	24.42236	24.85944	25.18700	25.16371	24.83876	24.99447	26.70000
North Dakota	15.55018	15.46871	14.94046	13.75718	13.24298	13.13815	13.90962	15.53547	14.92702	14.93796	14.27578
Ohio	23.86178	23.73246	22.92073	22.32478	23.20690	23.83693	24.14408	24.43882	23.79691	23.89197	25.25000
Oklahoma	22.72718	22.60811	21.83605	20.67259	23.29143	23.39403	24.83400	25.89400	26.12800	17.35345	19.93863
Oregon	24.60503	24.47612	23.64027	22.38275	22.72195	22.60723	23.18400	23.29600	– –	23.09600	22.00000
Pennsylvania	24.73076	24.36478	23.54189	22.48706	23.15028	23.72419	25.11754	24.82982	24.70349	24.64969	25.26545
Rhode Island	24.72100	24.31600	23.47600	22.27200	22.71900	23.03100	25.19900	24.69600	24.63800	24.49700	27.35000
South Carolina	24.76172	24.63199	23.79081	23.49264	24.41433	24.85378	24.87489	25.50314	24.71660	24.97200	26.21051
South Dakota	19.41154	19.30984	18.65041	16.85997	18.42630	19.36902	18.37453	19.07166	21.61937	17.33200	19.76699
Tennessee	24.71533	24.58404	23.74488	23.48019	23.96977	24.38903	24.74124	25.27626	25.04338	25.02904	26.04000
Texas	14.95177	14.87344	14.36552	– –	15.20049	22.51056	25.89608	– –	– –	25.51014	24.81832
Utah	25.89198	25.75633	24.87676	23.74007	23.17910	23.56200	23.14974	23.29600	23.28200	23.09345	23.54893
Vermont	24.72100	24.31600	23.47600	22.27200	22.71900	24.39899	25.19900	24.69600	24.63800	24.61419	27.35000
Virginia	24.78525	24.65237	23.81029	23.46220	24.41436	24.86362	25.08712	24.99689	25.10405	24.92831	26.40706
Washington	22.90924	22.78922	22.01097	19.96772	22.77100	23.45190	21.73662	22.63392	23.09783	22.87154	26.60000
West Virginia	24.99691	24.86595	24.01679	23.70919	24.05881	24.85990	25.01748	24.82246	24.68019	24.73754	25.76982
Wisconsin	21.92254	21.80607	21.06114	18.98021	24.26544	24.56793	24.97777	25.07766	25.05235	24.92021	27.45000
Wyoming	20.62538	20.51732	19.81665	18.57163	17.80856	17.26200	19.93489	18.24057	18.19276	18.03000	20.31540
U.S. Average	23.94283	23.77600	22.98985	22.12012	22.89233	22.68213	23.02050	23.02709	22.71809	22.37879	23.27631

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B9. Approximate Heat Content of Coal Consumed by the Residential and Commercial Sector, 1999-2008

(Million Btu per Short Ton)

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	25.88280	25.45000	18.84468	24.23196	24.22414	24.22414	25.12953	24.29513	25.19517	– –
Alaska	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000	15.28028
Arizona	21.95554	21.95554	18.81885	18.96261	18.65717	18.77970	18.95945	18.91365	19.70261	– –
Arkansas	25.46394	– –	– –	25.20226	– –	25.20226	– –	25.20226	22.93197	– –
California	23.74003	23.79000	23.54564	25.20226	24.57779	22.39951	22.69029	23.54564	– –	– –
Colorado	22.48006	21.70600	22.42877	22.40126	22.49956	22.46007	22.38331	22.32441	22.41875	24.19459
Connecticut	27.53000	24.84184	25.19040	25.20226	25.17420	25.20226	25.20226	25.20226	25.20226	– –
Delaware	26.15092	26.11800	25.20226	– –	– –	– –	– –	25.20226	25.20226	– –
District of Columbia	25.30000	25.30000	24.69356	24.69356	24.69356	24.69356	24.69356	– –	24.69356	27.39468
Florida	25.97502	25.75000	23.49457	24.35506	24.70354	– –	25.20226	25.20226	25.20226	– –
Georgia	25.84901	25.64200	25.71566	25.71566	– –	25.71415	24.87197	– –	24.33092	28.00000
Hawaii	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Idaho	21.04956	22.06000	22.34782	22.07382	21.64352	18.44441	21.28274	21.54563	23.00660	23.49119
Illinois	21.96000	21.95496	23.09564	23.07288	22.94355	22.88660	22.90367	22.93419	22.91509	22.22723
Indiana	25.00000	23.51901	22.30349	22.27207	22.38880	22.34328	22.45479	22.37152	22.35171	23.07269
Iowa	25.97000	26.10085	23.86811	24.17926	24.05462	23.39265	23.53537	23.40740	23.40796	23.15424
Kansas	24.70725	24.15600	24.17185	24.02541	23.54564	– –	– –	23.54564	– –	– –
Kentucky	26.23869	26.40800	24.90121	24.70391	24.37750	24.09277	24.06740	23.66777	23.69848	27.27378
Louisiana	– –	23.48200	– –	– –	– –	– –	– –	– –	24.35479	– –
Maine	26.08147	25.92200	25.19811	25.19627	25.20226	25.20226	25.20226	25.20226	25.20226	– –
Maryland	25.29975	25.07200	24.92243	24.61596	24.79575	24.69992	24.70913	24.73325	24.74548	26.13809
Massachusetts	27.53458	27.07000	25.39455	24.64837	24.99683	24.46855	24.96940	24.77280	24.63665	– –
Michigan	25.10000	25.09987	24.08681	23.59538	23.70301	24.50332	24.35677	24.37527	24.46919	25.59426
Minnesota	19.31135	19.29400	24.33092	17.38221	18.74383	20.36034	19.42854	17.78220	19.32423	18.04887
Mississippi	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Missouri	22.43000	22.01372	22.98069	23.14705	23.25095	23.19464	23.21647	23.19520	23.07965	22.71598
Montana	17.09403	16.01600	18.22272	18.51422	18.41265	18.11776	18.12135	18.11776	18.11776	25.04621
Nebraska	– –	– –	22.34669	22.39411	22.43902	22.39620	22.37023	22.29536	22.34906	– –
Nevada	23.10820	23.10820	19.61653	18.11776	18.11776	18.11776	18.11776	18.11776	22.34906	– –
New Hampshire	27.53000	25.92200	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	– –
New Jersey	25.31653	25.50000	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	– –
New Mexico	25.11200	25.21200	18.81885	18.78502	19.00920	19.24556	18.81298	18.92875	18.58149	– –
New York	25.51000	25.31147	24.84639	25.09365	25.20226	24.99169	25.01044	24.85989	24.91799	25.25304
North Carolina	27.00000	27.00000	25.07997	24.82548	25.32901	24.77161	25.37342	25.11335	25.31826	26.73843
North Dakota	14.26426	14.22800	16.00252	16.22776	16.37937	16.98175	18.09798	17.84725	15.91616	17.12253
Ohio	24.14000	24.01316	24.11117	24.20238	24.14877	21.33540	23.98104	24.19434	24.12152	26.65248
Oklahoma	19.77893	– –	24.21484	24.21484	24.21484	– –	24.27606	24.55713	24.69356	– –
Oregon	23.30868	23.30868	– –	– –	– –	– –	– –	– –	– –	– –
Pennsylvania	25.44396	26.38599	25.13691	25.10969	25.12376	25.10462	25.13163	25.12478	25.12626	25.72858
Rhode Island	27.53000	25.92200	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	– –
South Carolina	26.34668	– –	– –	25.20226	– –	– –	– –	24.33114	25.20226	27.54165
South Dakota	20.36609	20.86800	23.50629	17.38116	17.38116	17.38116	17.38116	17.38116	17.38116	25.89251
Tennessee	26.04000	26.04538	24.45667	24.55328	23.83116	23.49719	24.70386	24.38566	24.53965	25.61255
Texas	16.25125	16.28000	25.62310	18.68536	19.22769	25.68290	25.71566	25.20226	25.20226	27.48310
Utah	23.36625	23.21000	23.54375	23.54578	23.54700	23.54652	23.55080	23.54245	23.53943	– –
Vermont	27.53000	25.92200	25.20226	25.20226	25.20226	25.20226	25.20226	25.20226	25.36313	– –
Virginia	26.45535	26.17391	25.04189	25.04500	24.92450	25.00427	24.85854	24.74545	24.77679	26.51997
Washington	25.98000	25.96100	23.48820	23.50574	23.51911	23.51009	– –	17.38116	17.38116	– –
West Virginia	25.70998	25.74200	24.76458	24.74624	24.76538	24.71213	24.69710	24.71636	24.70421	– –
Wisconsin	26.79000	27.65942	24.44771	24.30858	24.71652	24.32607	18.94545	24.35425	24.33542	26.89024
Wyoming	20.19004	20.11600	17.74573	17.83742	17.86023	17.87893	17.86891	17.89542	17.90731	21.84996
U.S. Average	23.66758	23.36355	22.70619	22.44931	22.48756	22.31421	22.05262	21.91488	22.17880	22.94115

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B10. Approximate Heat Content of Coal Consumed by Other Industrial Users, Selected Years, 1960-1998

(Million Btu per Short Ton)

State	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Alabama	25.17776	24.96027	23.54166	22.98960	24.10560	24.38311	24.67898	24.84808	24.78508	24.67890	24.87433
Alaska	19.42837	19.25707	18.14004	17.68383	– –	– –	– –	– –	15.80000	15.84800	15.71000
Arizona	21.61434	21.42376	20.18105	19.77788	20.37305	20.25740	20.07050	19.96204	19.79709	19.54036	19.25030
Arkansas	25.42843	25.20422	– –	21.33575	21.40613	21.30956	22.80790	23.95685	23.98664	23.58123	24.43193
California	26.05221	25.82250	24.32464	22.98540	22.17313	23.29909	22.52224	23.29600	23.28200	23.05519	22.99659
Colorado	23.55826	23.35054	21.99607	21.39183	21.81821	21.56832	21.10513	21.70231	21.57372	21.57222	21.26260
Connecticut	25.78016	25.55285	24.07063	23.62736	– –	24.41914	25.19900	– –	– –	– –	– –
Delaware	25.35920	25.12886	23.74325	23.44148	24.47242	24.71973	24.93784	25.19175	25.14560	25.21542	25.16859
District of Columbia	25.88358	25.65536	24.16719	23.78591	24.35746	– –	– –	– –	– –	– –	– –
Florida	– –	– –	– –	23.54145	22.89184	24.77766	25.00471	25.10701	25.11598	25.05234	25.00217
Georgia	25.42319	25.19903	23.73733	23.50777	24.33122	24.81778	25.14819	25.19814	25.13735	25.08994	25.07925
Hawaii	– –	– –	– –	– –	– –	24.68800	24.81000	21.50000	21.50000	22.49862	23.04000
Idaho	22.54363	22.34486	21.04872	19.93455	17.68403	17.76163	17.85823	19.03477	18.16585	17.33200	18.15972
Illinois	23.84790	23.63069	22.26726	21.69430	22.35658	22.79936	22.55646	22.83681	22.84938	23.17145	23.04887
Indiana	24.01127	23.79938	22.41888	21.82415	22.25323	22.43118	22.71236	23.05468	22.71535	23.18017	23.25752
Iowa	23.56545	23.33520	21.98253	21.31980	21.51657	22.61050	22.58587	20.97803	21.30743	20.93210	21.17668
Kansas	22.67087	22.47098	21.16753	20.47974	21.56793	21.50635	24.22372	24.24071	25.47579	24.52305	24.79541
Kentucky	24.73441	24.49683	23.11929	22.90395	24.05911	24.51775	24.63342	24.84676	24.74520	24.48063	24.69544
Louisiana	– –	– –	– –	– –	22.15263	24.05362	19.97897	18.13611	25.01815	24.85731	25.18061
Maine	25.88863	25.62632	24.13365	23.97519	24.43949	24.86127	24.92375	25.10225	25.02589	24.98213	24.50979
Maryland	25.90399	25.67570	24.18970	23.65802	24.48487	24.72752	25.11792	25.32368	25.13270	25.11468	25.02943
Massachusetts	26.14994	25.90591	24.40195	23.79824	24.60203	24.84959	24.87740	25.17556	24.90749	25.03547	24.47621
Michigan	24.83068	24.61006	23.18747	22.89244	24.04413	24.74112	24.45063	24.02603	24.34533	24.35386	23.73938
Minnesota	19.52134	19.34921	18.22684	18.91730	17.08375	20.69045	18.56250	19.07827	19.14046	18.86921	18.61519
Mississippi	25.68109	25.45466	23.97813	23.21260	23.44243	23.39939	23.25386	24.07263	23.90664	23.67600	24.07408
Missouri	23.60136	23.39246	22.03613	21.43028	22.00267	22.32881	22.98843	23.17545	23.13412	22.82012	22.90858
Montana	22.82715	22.62588	21.31344	20.87854	19.03489	18.06841	18.37578	18.09956	18.21032	18.24449	17.91315
Nebraska	21.97456	21.78080	20.51738	19.28537	19.19380	18.59708	19.05305	19.35912	18.82313	19.13176	19.07469
Nevada	26.49581	26.14446	24.78307	23.42175	23.16143	23.56200	23.18400	22.66808	22.61981	22.98074	23.13890
New Hampshire	24.45007	24.23285	22.94496	23.36408	24.11207	24.62418	24.93865	25.21628	– –	– –	– –
New Jersey	25.38804	25.15576	23.71203	23.37734	23.52635	24.45329	25.23639	23.98345	24.63800	24.49700	23.78144
New Mexico	23.03750	22.83438	21.50984	– –	21.86701	21.62540	21.38800	22.00800	21.97600	21.78800	21.98800
New York	25.71896	25.48611	24.05437	23.63516	24.45387	24.85826	25.10824	25.11701	25.02823	25.16298	25.04125
North Carolina	25.44614	25.22177	23.75876	23.49028	24.41869	24.88021	24.93830	25.26890	25.14978	25.06093	25.06861
North Dakota	14.81208	14.68148	13.82987	13.03850	13.12013	13.16040	13.48903	13.35266	13.38232	13.28668	13.34170
Ohio	24.78928	24.56848	23.14857	22.67582	23.33942	24.17814	24.30376	24.51161	24.46949	24.43845	24.36431
Oklahoma	25.38348	25.15967	– –	23.43863	21.21166	21.43419	22.80216	22.67545	22.23193	20.88353	23.32931
Oregon	22.67719	22.47724	21.17342	20.34784	17.69347	17.86804	17.35230	19.02589	21.29915	20.52349	20.16974
Pennsylvania	25.47879	25.24913	23.88921	23.42998	24.11035	24.67778	24.92015	25.13491	25.06116	25.16267	24.90182
Rhode Island	24.72100	24.31600	23.47600	22.96321	24.09889	24.41914	25.19900	– –	– –	– –	– –
South Carolina	25.42102	25.19405	23.75586	23.47287	24.39898	24.86134	25.11786	25.19274	25.06364	25.08769	25.03090
South Dakota	19.90924	19.73370	18.58902	18.76511	19.21967	17.26200	17.33800	17.25800	17.30000	17.41854	17.51564
Tennessee	25.05567	24.83269	23.41284	23.12927	24.14518	24.57948	25.13269	25.13542	25.02032	25.00384	25.02139
Texas	16.85433	16.90156	17.88528	18.82484	16.29553	15.57653	14.78967	14.96538	15.34020	15.55204	14.23099
Utah	26.19847	25.96747	24.46120	23.64361	22.33114	22.27355	23.18867	23.00279	23.28200	23.48885	23.05627
Vermont	26.52519	26.29132	24.76626	24.05572	24.88781	24.26487	25.07890	– –	– –	24.49700	24.44600
Virginia	25.46128	25.23740	23.77727	23.47269	24.44795	24.90014	25.06954	25.08451	25.09830	24.94586	24.86104
Washington	25.95480	25.72596	24.23369	23.54643	21.36337	21.63429	22.70686	19.00628	19.65817	20.64702	23.00664
West Virginia	25.51633	25.29299	23.83024	23.52175	24.34671	24.84946	24.88832	24.97467	24.93964	24.96660	24.78222
Wisconsin	24.59694	24.37976	22.96605	21.95744	22.73534	23.32295	24.15041	24.21942	23.89132	24.13111	24.27928
Wyoming	20.53852	20.35742	19.17657	18.35566	17.95474	17.55529	22.17752	21.94055	21.89685	21.58115	21.93124
U.S. Average	24.65746	24.46031	23.06438	22.29033	22.69605	22.24945	22.42959	22.11162	22.15728	22.18651	21.96645

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B11. Approximate Heat Content of Coal Consumed by Other Industrial Users, 1999-2008

(Million Btu per Short Ton)

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	24.87429	25.45000	25.56317	25.61134	25.60454	25.33626	24.56787	24.70862	24.93387	25.21823
Alaska	15.71000	15.71000	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000	15.60000
Arizona	19.23730	22.16400	21.90688	22.34502	22.40728	21.93836	22.16263	22.04758	21.48787	20.59746
Arkansas	24.43179	25.15400	24.92946	24.79729	24.30495	24.40426	25.22954	24.90428	24.60889	24.63625
California	22.99659	23.79000	24.12823	23.88255	24.16352	24.12961	23.65788	24.09150	23.72794	23.35342
Colorado	21.25734	21.70600	21.76792	23.37126	23.21756	22.77619	23.14017	22.74847	22.94668	23.17129
Connecticut	– –	– –	– –	– –	– –	– –	24.69356	– –	– –	– –
Delaware	25.16618	26.15092	26.08942	25.91692	25.68903	26.08198	26.36905	26.40967	26.37436	25.78812
District of Columbia	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Florida	25.00308	25.75000	25.72868	25.61772	25.50327	25.85017	25.82357	25.40963	25.43144	25.43242
Georgia	25.07909	25.64200	25.71929	25.89083	25.86071	25.66513	25.58213	25.67680	25.72364	25.25716
Hawaii	23.04000	19.51800	18.13971	13.21369	26.40000	23.76000	23.87597	27.96538	24.96357	23.35631
Idaho	18.15972	22.06000	20.56167	20.87305	20.27673	20.34949	20.57427	20.35847	20.11580	19.82713
Illinois	23.05062	22.55200	22.27503	22.00140	21.63749	21.35039	21.60585	21.65652	21.59127	21.34908
Indiana	23.26278	23.86600	24.72806	24.56617	24.09312	24.36426	23.44946	23.48307	23.72260	24.15176
Iowa	21.17762	20.98000	20.98995	20.46674	20.79014	20.23722	20.18304	19.83169	20.21639	19.79344
Kansas	24.79543	24.15600	23.38449	24.01263	24.28579	24.85503	24.51132	24.00164	23.95535	24.70479
Kentucky	24.69546	26.40800	26.07951	26.73192	26.18923	26.29921	26.08980	26.10292	25.46282	25.91520
Louisiana	25.18061	24.50200	24.79641	24.38702	24.23213	24.62068	24.26804	24.09402	24.34344	24.25409
Maine	24.50979	25.92200	25.87095	25.85521	26.13598	25.57684	25.26999	25.43767	26.22635	26.24078
Maryland	24.99151	25.07200	26.15043	25.73619	25.39493	25.12167	24.44112	24.17387	24.46496	24.30269
Massachusetts	24.47621	27.07000	26.97528	27.05517	27.05441	27.23207	27.44733	26.26734	26.11529	26.53850
Michigan	23.73938	24.91200	25.09757	25.51789	25.63669	25.18729	25.02474	24.87818	25.23345	24.94190
Minnesota	18.61053	19.29400	19.46505	19.33533	18.93818	18.99910	18.99020	18.93201	19.04910	19.22290
Mississippi	24.07408	23.92200	24.17841	24.36851	24.14262	23.32565	23.65026	24.16007	23.87344	23.36384
Missouri	22.91315	23.12800	22.97924	23.15466	23.06086	23.00128	22.79619	22.73549	22.46448	22.50819
Montana	18.02330	16.01600	16.45749	14.69448	14.62430	14.87796	14.69438	14.46974	14.78685	15.33862
Nebraska	19.04352	20.50800	19.55943	20.50057	20.26782	20.10598	19.89831	19.42767	18.91903	18.78924
Nevada	23.13890	23.28000	23.37973	23.05508	23.27639	23.02476	22.61537	22.65562	22.86834	21.82894
New Hampshire	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
New Jersey	23.53789	25.50000	24.80000	25.20000	25.24380	25.23317	25.20163	25.06377	– –	– –
New Mexico	21.98800	25.21200	25.06600	24.75071	25.19525	24.67538	24.58808	24.56943	24.64852	24.44471
New York	25.04584	26.29400	25.53551	25.97046	26.07853	26.15033	26.37665	25.92775	26.25368	26.17590
North Carolina	25.06878	26.49200	26.75042	26.39726	26.46086	26.32947	26.21123	26.25415	26.22276	26.12505
North Dakota	13.34170	14.22800	14.17729	13.98412	14.31013	14.34435	14.27845	14.29338	14.28961	14.37678
Ohio	24.36436	24.81600	25.03997	25.14220	25.08606	25.23022	25.10471	25.03739	25.19506	25.01954
Oklahoma	23.32931	19.88200	19.97336	20.14169	20.43344	21.17481	21.15552	20.51318	20.64326	20.46905
Oregon	– –	– –	– –	22.26898	23.08909	21.85459	23.53227	24.54067	24.53553	24.35075
Pennsylvania	24.90660	24.47600	24.31768	24.11592	24.04275	23.71597	23.08512	22.68587	22.34064	22.14190
Rhode Island	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
South Carolina	25.03144	26.27000	26.07798	26.33401	26.19595	25.98648	25.82668	25.74241	25.91484	25.86167
South Dakota	17.51564	20.86800	16.86083	16.85455	16.76268	16.61502	16.63025	16.64773	16.91576	16.80974
Tennessee	25.02261	26.08800	25.74152	26.03713	26.00196	25.99079	25.90898	25.92540	25.93565	26.06741
Texas	14.22843	16.28000	17.00044	17.70065	17.54537	17.09972	17.16594	17.29000	21.64758	21.58698
Utah	23.05627	23.21000	23.45310	23.01697	23.15785	21.02872	23.05499	23.16044	22.79889	22.71712
Vermont	24.44600	– –	– –	– –	– –	– –	– –	– –	– –	– –
Virginia	24.86104	26.38600	26.21774	25.65424	26.31620	26.25933	26.11264	26.05355	26.07739	25.89165
Washington	23.00664	22.33200	22.65849	22.06989	23.17996	21.86739	20.75241	21.28815	23.38872	19.96149
West Virginia	24.78182	25.74200	25.53245	25.44492	25.17669	24.56337	24.80656	24.95200	24.97023	24.98111
Wisconsin	24.27942	23.69800	23.54541	23.45084	23.18524	23.15207	23.09987	22.71690	22.77891	22.79363
Wyoming	21.93124	20.11600	19.98672	20.14835	19.84803	19.91358	19.75331	19.82848	19.84741	19.64270
U.S. Average	21.88346	22.47646	22.65178	22.57467	22.51083	22.46391	22.17371	R 22.03535	R 22.37089	22.27483

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B12. Approximate Heat Content of Coal Consumed by the Electric Power Sector, Selected Years, 1960-1998

(Million Btu per Short Ton)

State	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Alabama	24.12600	23.70400	23.31400	23.16350	23.91189	24.11116	24.29927	23.71814	23.62530	23.23960	23.11732
Alaska	17.72900	17.85800	17.08000	17.40000	15.80000	15.80000	15.80000	15.80000	15.80000	15.80000	16.90141
Arizona	– –	20.85000	21.23800	21.08957	21.24312	20.98564	20.95147	20.57766	20.44148	20.34739	20.38344
Arkansas	– –	– –	– –	– –	17.00887	17.20748	17.47750	17.36965	17.39802	17.41297	17.34710
California	– –	– –	– –	– –	– –	– –	20.70330	22.06625	23.45821	21.85178	22.24980
Colorado	20.54600	21.32200	21.53000	19.80780	19.99201	19.49701	19.65952	19.77843	19.90650	19.73791	19.76528
Connecticut	26.54800	25.90800	23.54800	23.90400	– –	26.31651	25.80757	25.61179	25.61007	25.78092	25.60594
Delaware	25.98200	26.39200	24.18600	24.53412	24.92212	25.92406	26.06306	26.17331	26.03587	26.13235	25.90669
District of Columbia	27.46000	26.94800	25.92000	25.61888	– –	– –	– –	– –	– –	– –	– –
Florida	24.60600	23.76200	22.74800	23.09252	23.68622	24.45038	24.81791	24.30112	24.38155	24.32881	24.27066
Georgia	25.04200	24.93200	23.75600	23.75121	23.80495	24.24094	23.63792	22.99264	23.07567	23.26596	23.34800
Hawaii	– –	– –	– –	– –	– –	– –	17.56757	22.46192	21.99277	21.86457	21.98890
Idaho	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Illinois	21.69400	21.44800	21.00200	20.25912	20.59267	20.96903	21.58672	20.23176	20.09605	19.81497	19.95586
Indiana	22.64000	22.46600	22.03000	21.22923	21.63186	21.31356	21.12450	20.72512	20.75962	20.84809	20.99836
Iowa	20.76800	21.21800	20.88800	20.38486	18.63318	18.19661	17.82578	17.46392	17.36788	17.35340	17.75846
Kansas	23.75400	24.19200	24.10000	19.95680	18.36976	17.53691	17.84113	17.46468	17.63768	17.53745	17.39772
Kentucky	22.97200	22.89200	21.85200	21.48102	22.91705	22.76930	23.09104	23.29869	23.07877	23.16404	23.09505
Louisiana	– –	16.03793	– –	– –	– –	16.90673	16.42027	16.16720	16.32941	16.25260	16.19171
Maine	28.58000	– –	– –	– –	– –	– –	28.00000	25.50000	25.50000	26.00000	25.50000
Maryland	26.61600	26.37200	24.61200	24.32290	24.75727	25.32555	25.47905	25.92837	25.77953	25.82604	25.83073
Massachusetts	26.35200	26.07200	23.26000	24.34726	26.75129	26.56066	26.12189	25.40011	25.28340	25.12795	25.11719
Michigan	24.88400	24.80400	24.20200	23.66213	24.02458	23.39292	22.24344	21.37664	21.04777	21.18818	21.17513
Minnesota	22.39000	22.17600	20.27400	17.94022	17.55670	17.45075	17.64386	17.69994	17.86324	17.81417	17.80430
Mississippi	24.85800	24.89000	24.09800	23.16389	23.99361	24.25244	25.11539	22.43229	21.98747	20.96791	21.25237
Missouri	21.90400	21.55000	21.51800	21.49363	21.30576	21.28922	20.75755	18.50887	18.16688	17.97357	17.86978
Montana	13.50000	13.14000	15.47400	15.95909	17.00328	17.30703	17.10463	16.99483	16.87895	16.81662	16.83133
Nebraska	24.78200	24.56800	23.91400	20.95357	18.80879	17.29876	17.12467	17.19095	17.19019	17.19342	17.16400
Nevada	– –	25.48800	25.65400	22.38788	22.07779	22.76835	22.19062	22.12016	22.27863	22.36387	22.40233
New Hampshire	25.44800	27.90400	27.43200	26.70098	26.81635	26.90451	26.64473	26.26872	26.25812	26.12156	26.28170
New Jersey	26.76842	26.45784	24.94400	25.40124	26.18199	26.47525	26.83090	26.51285	26.07115	26.01541	26.14646
New Mexico	25.00000	18.00400	17.96600	17.84874	17.69514	18.37577	18.23374	18.06103	18.22953	18.14272	18.16905
New York	26.50514	26.67800	24.66400	24.05032	24.63519	25.20035	25.71847	25.91197	25.83610	26.01414	26.04338
North Carolina	26.24200	25.81400	24.11400	23.78836	24.53799	24.97487	25.19066	25.05575	24.94896	24.80074	24.85444
North Dakota	13.83600	13.91800	13.66600	13.34445	13.23368	13.15028	13.26794	13.16609	13.18832	13.09621	13.12410
Ohio	23.77000	23.56400	22.50000	21.91934	22.88041	23.62539	23.77469	24.24279	24.07984	23.78736	23.81224
Oklahoma	25.94198	24.00000	25.07600	25.07607	17.39280	17.16768	17.79161	17.46308	17.48181	17.58891	17.67738
Oregon	– –	– –	– –	– –	16.39258	16.58400	16.69555	17.76504	17.56340	17.51550	17.37069
Pennsylvania	23.43570	24.09503	23.34132	23.49794	24.17625	24.44508	23.35218	22.65412	22.62252	22.70900	22.84248
Rhode Island	28.15200	27.46800	– –	– –	– –	– –	– –	– –	– –	– –	– –
South Carolina	26.73400	25.82200	24.27400	24.16051	24.84295	25.13214	25.30294	25.70586	25.52136	25.70091	25.55763
South Dakota	17.16800	17.90400	16.57200	12.61613	12.59940	12.20986	13.20310	14.27626	18.32551	17.62504	17.75382
Tennessee	24.04000	23.59000	22.59400	21.98283	23.25397	23.65727	23.94393	24.29681	24.22004	23.99457	24.23173
Texas	– –	– –	– –	13.10305	14.79112	14.80734	14.57822	14.72568	14.98921	15.01066	15.05700
Utah	24.94000	25.18400	24.81200	23.64976	22.90042	23.60722	23.00247	22.78871	22.76216	22.40057	22.31132
Vermont	27.76000	27.34000	24.87000	25.74400	25.92600	25.62800	– –	– –	– –	– –	– –
Virginia	26.72600	26.47400	24.78200	23.93019	25.01317	25.62794	25.46145	25.53894	25.25975	25.15090	25.22663
Washington	– –	– –	– –	16.20000	16.20000	16.20000	16.27013	16.53810	15.86645	16.08781	16.43364
West Virginia	23.90800	23.73600	23.31800	23.22075	24.26929	24.82719	24.93097	24.48178	24.50303	24.54181	24.37571
Wisconsin	24.20800	24.03600	22.44600	21.23552	20.52333	19.54733	19.11105	18.56316	18.47512	18.67642	18.65018
Wyoming	14.84600	15.99000	16.53400	16.62585	17.59029	17.50962	17.68200	17.54191	17.47664	17.65017	17.63874
U.S. Average	23.92159	23.78120	22.57470	21.65048	21.35691	21.02274	20.77650	20.54157	20.54538	20.51618	20.51614

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

Table B13. Approximate Heat Content of Coal Consumed by the Electric Power Sector, 1999-2008

(Million Btu per Short Ton)

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	22.19134	22.06190	21.89221	22.45197	21.79318	21.47523	21.61294	21.54145	21.67367	21.26109
Alaska	16.65753	16.57100	16.53408	16.13460	16.26433	16.04137	15.27687	15.30578	15.08520	14.45657
Arizona	20.50387	20.42598	20.30467	20.30611	20.19154	20.39898	20.28681	20.26956	19.97240	19.67550
Arkansas	17.30255	17.35216	17.41107	17.28087	17.01818	16.97861	16.95471	16.95785	16.97025	17.17531
California	23.45239	23.50623	23.53335	23.59704	24.40935	24.37754	23.71536	24.38820	24.31097	23.80176
Colorado	19.55575	19.68516	19.56638	19.57370	19.46454	19.66264	19.81655	19.60565	19.60517	19.67296
Connecticut	24.57017	24.54238	24.57295	22.61785	20.35817	20.58489	20.22853	20.32643	20.58579	20.34505
Delaware	25.85637	25.89995	22.85394	24.64016	24.86200	24.57168	24.28918	24.63733	24.81605	24.54760
District of Columbia	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Florida	24.36377	24.39667	24.19654	24.47833	24.54170	24.31041	24.23466	24.05163	24.03623	23.71556
Georgia	23.25969	23.17564	23.32263	23.27634	23.19329	21.86980	21.87928	21.90760	21.95509	21.60805
Hawaii	21.92900	21.96268	21.95915	22.85558	22.78043	22.38158	22.18415	22.07703	22.12487	21.30587
Idaho	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Illinois	19.88917	19.00766	18.96250	17.98552	18.05192	17.94055	17.68141	17.55926	17.49529	17.48718
Indiana	21.17079	21.18776	21.07405	20.63657	20.77922	20.93030	21.19063	21.07852	20.92302	20.86885
Iowa	17.74086	17.74159	17.75174	17.45934	17.40657	17.36765	17.28278	17.29399	17.23753	17.05344
Kansas	17.28344	17.35757	17.40822	17.09551	17.07787	17.18522	17.00119	17.17619	17.14540	17.01472
Kentucky	23.10287	23.21985	22.85597	23.02596	22.91007	22.74220	22.82043	22.85545	23.22461	22.88940
Louisiana	16.29411	16.06360	16.02309	15.78423	15.83440	15.94059	15.95451	16.12599	16.05320	15.95925
Maine	25.50065	25.50206	25.50913	25.67508	26.34278	25.70556	25.85265	25.64576	R 26.24602	25.76705
Maryland	25.87305	25.58099	25.39357	25.94153	25.26517	25.16647	25.23948	25.19092	25.00874	25.29082
Massachusetts	25.17950	25.13633	24.58141	24.98333	24.27228	23.58180	23.16258	23.10606	22.92145	22.85196
Michigan	21.03606	20.87626	20.35290	19.80311	19.72285	19.57401	19.80124	19.85214	19.72277	19.52972
Minnesota	17.81200	17.88333	17.84650	17.52943	17.68778	17.63046	17.64381	17.63271	17.68637	17.70291
Mississippi	22.11560	23.07236	23.34428	19.15204	18.37832	18.21681	17.76711	17.96529	18.34497	18.32406
Missouri	17.90978	17.83803	17.83536	17.58855	17.52202	17.54298	17.62647	17.53874	17.55256	17.52599
Montana	16.84815	16.76161	16.76781	16.92120	17.00369	16.98414	16.87603	16.85404	16.83440	16.78311
Nebraska	17.00357	17.26387	17.16865	17.18567	17.23930	17.08372	17.13192	17.01431	17.01089	16.97944
Nevada	22.49028	22.46450	22.42843	20.35415	22.53116	22.19888	22.40665	22.79904	22.68834	21.72476
New Hampshire	26.33989	26.26371	26.10294	26.03410	26.06670	26.14847	25.58350	27.36274	27.57257	27.17132
New Jersey	26.14399	26.10622	26.00633	25.70562	25.49757	25.38477	25.04601	25.00918	23.93050	23.45131
New Mexico	18.26593	18.38786	18.50342	18.57152	18.35153	18.44824	18.54649	18.52520	18.42953	18.36526
New York	26.10032	26.09609	26.03933	25.59208	25.09965	24.07395	23.48868	22.91565	22.94660	22.02055
North Carolina	24.94669	24.96554	24.69647	24.61092	24.69934	24.59170	24.63823	24.38898	24.58092	24.42968
North Dakota	13.09452	13.05680	13.08158	13.00238	12.83980	12.93326	13.19614	13.07231	13.17149	13.30216
Ohio	23.85473	23.54852	23.09420	23.27825	23.48272	23.41907	23.03406	22.81731	R 22.70492	22.42763
Oklahoma	17.56985	17.71738	17.64096	17.63499	17.58214	17.58994	17.40067	17.43083	17.41296	17.17425
Oregon	17.92307	17.27270	17.41227	17.00023	17.12684	16.87994	16.83949	16.72021	16.73586	16.67497
Pennsylvania	23.02907	23.16297	22.44516	23.56468	22.98280	22.89989	22.49018	22.22317	22.28607	22.01264
Rhode Island	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
South Carolina	25.56171	25.40681	25.12150	24.67291	24.99159	24.89171	24.83801	24.93642	24.88119	24.61119
South Dakota	17.46863	17.18875	17.08216	16.95465	16.94182	16.95634	17.19573	16.94489	16.93546	16.78631
Tennessee	24.26070	24.20313	24.17211	23.03553	22.89925	22.64532	22.02668	21.96961	21.69786	21.20838
Texas	15.01573	15.19314	15.33008	15.44303	15.24670	15.27875	15.38507	15.44616	15.24276	15.38326
Utah	22.90924	22.92554	22.74758	22.51816	22.30324	22.08183	21.70165	22.04669	22.30438	22.21677
Vermont	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
Virginia	25.45736	25.67355	25.37158	25.42008	24.39707	24.46977	24.70347	24.82489	25.05643	24.78235
Washington	16.46003	16.19347	16.00174	15.99992	15.79913	16.01380	15.83882	16.27828	16.28884	15.90236
West Virginia	24.47831	24.33315	24.14704	24.20576	24.18395	24.05641	23.71011	23.83154	24.06430	23.65301
Wisconsin	18.59654	18.88566	18.70978	19.23048	18.27612	18.34803	19.31630	17.80872	17.81311	17.69684
Wyoming	17.61607	17.63312	17.72695	17.43899	17.79030	17.64503	17.56342	17.38634	17.28076	17.29399
U.S. Average	20.48955	20.51062	20.33690	20.23817	20.08181	19.98002	19.98765	19.93054	19.90845	19.71272

– – = Not applicable.
Where shown, R = Revised data.
Sources: See source listing at the end of this appendix.

APPENDIX B

Thermal Conversion Factor Source Documentation

Approximate Heat Content of Petroleum and Natural Gas Plant Liquids

Asphalt. EIA adopted the thermal conversion factor of 6.636 million British thermal units (Btu) per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Aviation Gasoline. EIA adopted the Bureau of Mines thermal conversion factor of 5.048 million Btu per barrel for "Gasoline, Aviation" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

Butane. EIA adopted the Bureau of Mines thermal conversion factor of 4.326 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Butane-Propane Mixture. EIA adopted the Bureau of Mines calculation of 4.130 million Btu per barrel based on an assumed mixture of 60 percent butane and 40 percent propane. See **Butane** and **Propane**.

Crude Oil (Including Lease Condensate) Used Directly. EIA adopted the thermal conversion factor of 5.800 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Value of Various Fuels, Adopted January 3, 1950."

Distillate Fuel Oil. EIA adopted the thermal conversion factor of 5.825 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Value of Various Fuels, Adopted January 3, 1950."

Ethane. EIA adopted the Bureau of Mines thermal conversion factor of 3.082 million Btu per barrel as published in the *California Oil World and Petroleum Industry,* First Issue, April 1942.

Ethane-Propane Mixture. EIA calculated 3.308 million Btu per barrel on the basis of an assumed mixture of 70 percent ethane and 30 percent propane. See **Ethane** and **Propane**.

Isobutane. EIA adopted the Bureau of Mines thermal conversion factor of 3.974 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Jet Fuel, Kerosene Type. EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel for "Jet Fuel, Commercial" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

Jet Fuel, Naphtha Type. EIA adopted the Bureau of Mines thermal conversion factor of 5.355 million Btu per barrel for "Jet Fuel, Military" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

Kerosene. EIA adopted the thermal conversion factor of 5.670 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950.

Liquefied Petroleum Gases. (LGTCKUS)

- 1960 through 1966: U.S. Department of the Interior, Bureau of Mines, *Mineral Industry Surveys*, "Crude Petroleum and Petroleum Products, 1956," Table 4 footnote, constant value of 4.011 million Btu per barrel.

• 1967 forward: Calculated annually by EIA as a weighted average by multiplying the quantity consumed of each of the component products by each product's conversion factor, listed in this appendix, and dividing the sum of those heat contents by the sum of the quantities consumed. The component products are ethane (including ethylene), propane (including propylene), normal butane (including butylene), butane-propane mixtures, ethane-propane mixtures, and isobutane. Quantities consumed are from: EIA, *Energy Data Reports*, "Petroleum Statement, Annual," Table 1 (1967 through 1980), EIA, *Petroleum Supply Annual*, Table 2 (1981 through 2004), and EIA, *Petroleum Supply Annual*, Table 1 (2005 forward).

Lubricants. EIA adopted the thermal conversion factor of 6.065 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.*

Miscellaneous Products. EIA adopted the thermal conversion factor of 5.796 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.*

Motor Gasoline. (MGTCKUS)
• 1960 through 1993: EIA adopted the Bureau of Mines thermal conversion factor of 5.253 million Btu per barrel for "Gasoline, Motor Fuel" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.
• 1994 forward: EIA calculates national annual quantity-weighted average conversion factors for conventional, reformulated, and oxygenated motor gasolines (see Table B1). The factor for conventional motor gasoline is 5.253 million Btu per barrel, as used for previous years. The factors for reformulated and oxygenated gasolines, both currently 5.150 million Btu per barrel, are based on data published in the Environmental Protection Agency, Office of Mobile Sources, National Vehicle and Fuel Emissions Laboratory report EPA 420-F-95-003, *Fuel Economy Impact Analysis of Reformulated Gasoline*.

Natural Gasoline. EIA adopted the thermal conversion factor of 4.620 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Pentanes Plus. EIA assumed the thermal conversion factor to be 4.620 million Btu per barrel, equal to that for natural gasoline. See **Natural Gasoline**.

Petrochemical Feedstocks, Naphtha Less Than 401 ºF. EIA assumed the thermal conversion factor to be 5.248 million Btu per barrel, equal to that for special naphthas. See **Special Naphthas**.

Petrochemical Feedstock, Other Oils Equal to or Greater Than 401 ºF. EIA assumed the thermal conversion factor to be 5.825 million Btu per barrel, equal to that for distillate fuel oil. See **Distillate Fuel Oil**.

Petrochemical Feedstock, Still Gas. Assumed by EIA to be 6.000 million Btu per barrel, equal to the thermal conversion factor for still gas. See **Still Gas**.

Petroleum Coke. EIA adopted the thermal conversion factor of 6.024 million Btu per barrel as reported in Btu per short ton in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Value of Various Fuels, Adopted January 3, 1950." The Bureau of Mines calculated this factor by dividing 30,120,000 Btu per short ton, as given in the referenced Bureau of Mines internal memorandum, by 5.0 barrels per short ton, as given in the Bureau of Mines Form 6–1300–M and successor EIA forms.

Petroleum Products, Total Consumption. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed, weighted by the quantity of each petroleum product consumed.

Plant Condensate. EIA estimated 5.418 million Btu per barrel from data provided by McClanahan Consultants, Inc., Houston, Texas.

Propane. EIA adopted the Bureau of Mines thermal conversion factor of 3.836 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Residual Fuel Oil. EIA adopted the thermal conversion factor of 6.287 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Road Oil. EIA adopted the Bureau of Mines thermal conversion factor of 6.636 million Btu per barrel, equal to that of asphalt and first published by the Bureau of Mines in the *Petroleum Statement, Annual, 1970*. See **Asphalt**.

Special Naphthas. EIA adopted the Bureau of Mines thermal conversion factor of 5.248 million Btu per barrel, equal to that of total gasoline (aviation and motor) and first published in the *Petroleum Statement, Annual, 1970*.

Still Gas. EIA adopted the Bureau of Mines estimated thermal conversion factor of 6.000 million Btu per barrel and first published in the *Petroleum Statement, Annual, 1970*.

Unfinished Oil. EIA assumed the thermal conversion factor to be 5.825 million Btu per barrel, equal to that for distillate fuel oil and first published in the *Annual Report to Congress, Volume 3, 1977*. See **Distillate Fuel Oil**.

Unfractionated Stream. EIA assumed the thermal conversion factor to be 5.418 million Btu per barrel, equal to that for plant condensate and first published in the EIA, *Annual Report to Congress, Volume 2, 1981*. See **Plant Condensate**.

Waxes. EIA adopted the thermal conversion factor of 5.537 million Btu per barrel as estimated by the Bureau of Mines and first published in the EIA, *Petroleum Statement, Annual, 1956*.

Approximate Heat Content of Natural Gas

Natural Gas, Total Consumption. (NGTCKZZ)

- 1960 through 1962: EIA adopted the thermal conversion factor of 1,035 Btu per cubic foot as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.
- 1963 through 1979: EIA adopted the thermal conversion factors calculated annually by the American Gas Association (AGA) and published in *Gas Facts*, an AGA annual.
- 1980 through 1996: EIA, *Historical Natural Gas Annual 1930 Through 2000*, Table 16.
- 1997 forward: EIA, *Natural Gas Annual*, Table 16, http://www.eia.gov/oil_gas/natural_gas/data_publications/natural_gas_annual/ nga_historical.html and unpublished revisions.

Natural Gas, Consumption by the Electric Power Sector. (NGEIKZZ)

- 1960 through 1971: Assumed by EIA to be equal to the thermal conversion factor for the consumption of natural gas by all users. See **Natural Gas, Total Consumption.**
- 1972 through 1982: Calculated annually by EIA by dividing the total heat content of natural gas received at steam electric plants 25 megawatts or greater by the total quantity received at those electric plants. The heat contents and quantities received are from the Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants."
- 1983 through 1988: The average heat content of natural gas received at steam electric plants 50 megawatts capacity or larger from FERC Form 423 and published from 1993 forward in Btu per cubic foot in the EIA, *Cost and Quality of Fuels for Electric Utility Plants,* Table 14, http://www.eia.gov/cneaf/ electricity/cq/cq_sum.html. Note: For States that reported consumption on EIA-759 but were not large enough to report on FERC Form 423, factors were estimated by using previous years' factors or the factor for total natural gas consumption in the State.
- 1989 forward: Calculated by dividing the total heat content of natural gas received at electric power plants (including electric utilities, nonutility power plants and combined heat-and-power plants) by the total quantity consumed in physical units collected by the EIA on Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/ cneaf/electricity/page/eia906_920.html.

Approximate Heat Content of Coal and Coal Coke

Coal, Consumption at Coke Plants. (CLKCKZZ)

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS. — Anthracite conversion factor (for all end-use sectors) sources: –1960 through 1997: Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for." — Bituminous coal and lignite conversion factor sources: –1960 through 1972: U.S. Department of the Interior, Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite," sum of columns

"Beehive coke plants" and "Oven coke plants." –1973 through 1984: EIA, *Weekly Coal Production*, August 9, 1986, Table 8. –1985 through 1987: EIA, *Weekly Coal Production*, July 16, 1988, Table 7. –1988 through 1997: EIA, Unpublished data from Form EIA-5.

• 1998 through 2000: Average total coal factors by State calculated by EIA using unpublished data from Form EIA-5. The 1998 State factors are used for 1999 and 2000.

• 2001 forward: Calculated by EIA from data reported on Form EIA-5, "Quarterly Coal Consumption and Quality Report, Coke Plants." Coke plant data on tons of coal carbonized to create coke, the volatilities of the coal carbonized, and conversion factors based on coal volatility are used to calculate average conversion factors by State.

Coal, Consumption by the Electric Power Sector. (CLEIKZZ)

• 1960 through 1988: Calculated by EIA as the consumption-weighted average of national- level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS. — Anthracite conversion factor sources: –1960 through 1972: U.S. Energy Information Administration (EIA) assumed that all anthracite consumed at electric utilities was recovered from culm banks and river dredging and was estimated to have an average heat content of 17.500 million Btu per short ton. –1973 through 1988: Calculated annually by EIA by dividing the heat content of anthracite receipts at electric utilities by the quantity of anthracite received at electric utilities. These data are reported on the Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," and predecessor forms. — Bituminous coal and lignite conversion factor sources: –1960 through 1972: EIA adopted the average thermal conversion factor of the Bureau of Mines, which used the National Coal Association (NCA) average thermal conversion factor for electric utilities calculated from the Federal Power Commission's (FPC) Form 1 and published in *Steam Electric Plant Factors*, an NCA annual report. The specific tables are: –1960 and 1961, Table 1. –1962 through 1972, Table 2. –1973 through 1982: The average heat content of coal received at steam electric plants 25 megawatts or greater from FPC Form 423 and published in Btu per pound in EIA, *Cost and Quality of Fuels for Electric Utility Plants*, tables titled "Destination and Origin of Coal 'Delivered to' (1973–1979) 'Receipts to' (1980) 'Received at' (1981–1982) Steam-Electric Plants 25-MW or Greater." –1983 through 1988: The average heat content of coal received at steam electric plants 50 megawatts capacity or larger from FERC Form 423 and published in Btu per pound in the EIA, *Cost and Quality of Fuels for Electric Utility Plants.* The 1997 edition is available electronically only via Internet at: http://www.eia.gov/FTPROOT/electricity/019197.pdf. The specific tables are: –1983 and 1984, Table 58. –1985 through 1988, Table 48.

Notes: The State conversion factors for 1960 through 1972 were derived from actual consumption data, while the conversion factors for 1973 to 1988 were based on receipts of coal. The factors for 1960 through 1972 may also have included some quantities of anthracite. These breaks in the series create some data discrepancies. In instances where a State had no receipts for a particular year but did report consumption, it was assumed that the coal received in one year was consumed during the following year and the Btu value of the previous year's receipts was used.

• 1989 forward: Calculated by dividing the total heat content of coal received at electric power plants (including electric utilities, nonutility power plants and combined heat-and-power plants) by the total quantity consumed in physical units collected on Form EIA-923, "Power Plant Operations Report," and predecessor forms, http://www.eia.gov/cneaf/electricity/page/eia906_920.html.

• Alaska factors: The sources used to develop thermal conversion factors for bituminous coal and lignite consumed by the electric power sector—the National Coal Association report and the Federal Power Commission's (FPC) Form 423 and FERC Form 423 published in the *Cost and Quality of Fuels for Electric Utility Plants*—exclude Alaska. However, Alaska reported consumption of bituminous coal and lignite at electric utilities for all years, 1960 forward. Unpublished FPC heat rates for coal at electric utilities in Alaska were used for 1960 through 1972. The 1972 conversion factor (the last year for which a conversion factor was reported for Alaska) was used for 1973 through 1978. According to industry sources, new mines were opened in 1978 and a more representative factor was used for 1979 through 1997. From 1998 forward, the Alaska factor is calculated using the same methodology as is used for other States, described above.

Coal, Consumption by Other Industrial Users. (CLOCKZZ)

• 1960 through 1997: Calculated by EIA as the consumption-weighted average of national level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS. — Anthracite conversion factor sources: –1960 through 1997: Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for." — Bituminous coal and lignite conversion factor sources: –1960 through 1973:

Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed by industrial users other than coke plants by the ratios of 1960 through 1973 national averages for the other industrial users to its 1974 average. –1974 through 1997: Calculated by EIA by assuming that the bituminous coal and lignite consumed by industrial users other than coke plants in each State contained heating values equal to those of bituminous coal and lignite received at electric utilities in each State from identified coal-producing districts as reported on Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to other industrial users in each State and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.

- 1998 through 2000: The average heat content of coal received at manufacturing plants (other than coke plants) consuming more than 1,000 short tons of coal during the year from Form EIA-3A and published in Btu per pound in the EIA *Annual Coal Report* and predecessor publications.
- 2001 forward: Calculated by EIA using unpublished data as the average heat content of (1) coal received at manufacturing plants (other than coke plants) consuming more than 1,000 short tons of coal annually from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users," and predecessor forms; (2) coal distributed to agricultural, mining, and construction sectors reported on Form EIA-6A, "Coal Distribution Report - Annual" with heat contents for the coal producing State reported on FERC Form 423 and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants" (discontinued after 2007); and (3) coal consumed by coal mining facilities reported on Form EIA-7A, "Coal Production Report," with heat contents for the coal producing State reported on Form EIA-923, "Power Plant Operations Report," and predecessor forms.

Coal, Consumption by Residential and Commercial Users. (CLHCKZZ)

- 1960 through 1997: Calculated by EIA as the consumption-weighted average of national-level anthracite conversion factors and State-level bituminous coal and lignite factors using factors and consumption from SEDS. — Anthracite conversion factor sources: –1960 through 1997: Calculated annually by EIA by dividing the heat content of anthracite produced less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumption by all sectors other than the electric utility sector less the quantity of anthracite stock changes, losses, and "unaccounted for." — Bituminous coal and lignite conversion factor sources: –1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed in the residential and commercial sector by the ratios of 1960 through 1973 national averages for the sector to its 1974 average. –1974 through 1997: Calculated by EIA by assuming that the bituminous coal and lignite consumed in the residential and commercial sector in each State contained heating values equal to those of bituminous coal and lignite received at electric utilities in each State from identified coal-producing districts as reported on the Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to the residential and commercial sector in each State and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1998 through 2000: The average heat content of coal received for the residential and commercial sectors as reported on the EIA-860. For States that are not represented in data on the EIA-860, it is assumed that the heat content of the coal receipts in theses sectors is equivalent to the heat content of coal received in the other industrial sector. For States that are not represented in either the EIA-3A data or the EIA-860 data (CT, NH, VT and DC), the heat content of coal receipts in MA is used for CT, NH, and VT and the heat content of coal receipts in MD is used for DC, since the origin of the coal receipts are similar.
- 2001 through 2007: Calculated by EIA from the coal distribution data reported on Form EIA-6A, "Coal Distribution Report - Annual," and the average heat content of coal reported on FERC Form 423 and Form EIA-423, "Monthly Cost and Quality of Fuels for Electric Plants." Form EIA-6A provides distribution data for the combined residential and commercial sectors by State of origin to the destination State. FERC Form 423 and Form EIA-423 provide the average heat content of coal produced in the State of origin.
- 2008 forward: Calculated by EIA using unpublished data as the average heat content of coal received at commercial and institutional establishments consuming more than 1,000 short tons of coal annually from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users."

Coal, Consumption by Transportation Users. (CLACKZZ)
- 1960 through 1977: Assumed by EIA to be equal to the Btu conversion factor for bituminous coal and lignite consumption by industrial users other than coke plants: –1960 through 1973: Estimated by EIA by adjusting the 1974 average heat value of bituminous coal and lignite consumed by industrial users other than coke plants by the ratios of 1960 through 1973 national averages for the other industrial users to its 1974 average. –1974 through 1977: Calculated by EIA by assuming that the bituminous coal and lignite consumed by industrial users other than coke plants in each State contained heating values equal to those of bituminous coal and lignite received at electric utilities in each State from identified coal-producing districts as reported on Federal Energy Regulatory Commission (FERC) Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." The average Btu content of coal delivered from each coal-producing district was applied to deliveries to other industrial users in each State and the sum total of the heat content was divided by total tonnages, yielding a weighted average. The coal distribution data by coal-producing district are reported on Form EIA-6, "Coal Distribution Report," and predecessor Bureau of Mines Form 6-1419-Q.
- 1978 forward: Transportation sector coal is included in the other industrial category. Zero is entered for this variable.

Coal Coke, Imports and Exports. EIA adopted the Bureau of Mines estimate of 24.800 million Btu per short ton.

Approximate Heat Content of Renewable Energy Sources

Fuel Ethanol. Fuel ethanol, which is derived from agricultural feedstocks (primarily corn) and blended into motor gasoline, is computed separately in SEDS to display the use of renewable energy in the commercial, industrial, and transportation sector. EIA adopted the denatured thermal conversion factor of 3.563 million Btu per barrel published in EIA, *Monthly Energy Review*, Table A3 of Appendix A, http://www.eia.gov/emeu/mer/append_a.html. This factor is calculated by EIA using the 2009 quantity-weighted average of the thermal conversion factors for undenatured ethanol (3.539 million Btu per barrel), pentanes plus used as denaturant (4.620 million Btu per barrel), and conventional motor gasoline used as denaturant (5.253 million Btu per barrel). The undenatured thermal conversion factor of 3.539 million Btu per barrel is published in "Oxygenate Flexibility for Future Fuels," a paper presented by William J. Piel of the ARCO Chemical Company at the National Conference on Reformulated Gasolines and Clean Air Act Implementation, Washington, D.C., October 1991.

Wood, Consumption by the Residential and Commercial Sectors. Estimated by EIA to be 20 million Btu per cord of wood. This rough average factor takes into account a number of variables, such as moisture content and species of wood, as explained in the EIA, *Household Energy Consumption and Expenditures 1993*, page 314.

Approximate Heat Rates for Electricity

Fossil-Fueled Steam-Electric Plant Generation. (FFETKUS) There is no generally accepted practice for measuring the thermal conversion rates for power plants that generate electricity from hydroelectric, biomass fuels, wind, photovoltaic, or solar thermal energy sources. Therefore, EIA uses data from Form EIA–767 to calculate a rate factor that is equal to the prevailing annual average heat rate factor for fossil-fueled steam-electric power plants in the United States. By using that factor, it is possible to evaluate fossil fuel requirements for replacing those sources during periods of interruption, such as droughts. The heat content of a kilowatthour of electricity produced, regardless of the generation process, is 3,412 Btu per kilowatthour.
- 1960 through 1988: The weighted annual average heat rate for fossil-fueled steam-electric power plants in the United States, as published by EIA in *Electric Plant Cost and Power Production Expenses 1991*, Table 9.
- 1989 through 2000: Calculated annually by EIA by using heat rate data reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms); and net generation data reported on Form EIA-759, "Monthly Power Plant Report." The computation includes data for all electric utility steam-electric plants using fossil fuels.
- 2001 forward: Calculated annually by EIA by using fuel consumption and net generation data reported on Form EIA-923, "Power Plant Operations Report," and predeccessor forms. The computation includes data for all electric utilities and electricity-only independent power producers using fossil fuels.

Geothermal Energy Plant Generation. (GEETKUS)

• 1960 through 1981: Calculated by EIA by weighting the annual average heat rates of operating geothermal units by the installed nameplate capacities as reported on FPC Form 12.
• 1982 forward: Estimated annually by EIA based on an informal survey of relevant plants.

Nuclear Steam-Electric Plant Generation. (NUETKUS)
• 1960 through 1984: Calculated annually by EIA by dividing the total heat content consumed in nuclear generating units by the total (net) electricity generated by nuclear generating units. The heat content and electricity generation data are reported on FERC Form 1, Form EIA-412, and predecessor forms. The factors for 1982 through 1991 are published in the following EIA reports—1982: *Historical Plant Cost and Annual Production Expenses for Selected Electric Plants 1982*, page 215; 1983 and 1984: *Electric Plant Cost and Power Production Expenses 1991*, Table 13.
• 1985 forward: Calculated annually by EIA using the heat rate reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms), and the generation reported on Form EIA-923, "Power Plant Operations Report" (and predecessor forms).

Appendix C

Resident Population

The population data used in the U.S. Energy Information Administration State Energy Data System (SEDS) to calculate per capita consumption are shown in Tables C1 through C5. The data are the U.S. Department of Commerce, Bureau of the Census, resident population estimates by State. The reference date for the estimates is July 1 of each year.

The sum of the State estimates may not match the U.S. estimates. More recent revisions to the U.S. estimates have been incorporated into the U.S. tables available on the Census Bureau website that are not included in the State estimates.

Data Sources

TPOPPUS — Resident population of the United States.

- 1960 through 1989: U.S. Department of Commerce, Bureau of the Census http://www.census.gov/popest/archives/1990s/popclockest.txt
- 1990 through 1999: U.S. Department of Commerce, Bureau of the Census, Internet Release http://www.census.gov/popest/archives/2000s/vintage_2001/CO-EST2001-12/
- 2000 forward: http://www.census.gov/popest/states/NST-ann-est.html

TPOPPZZ — Resident population by State.

- 1960 and 1970: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1980,* Section 1 Population, "No. 10. Resident Population--States: 1950 to 1979".
- 1980: U.S. Department of Commerce, Bureau of the Census, http://www.census.gov/popest/archives/1980s/s5yr8090.txt
- 1960 through 1989: U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, "Population Estimates and Projections," Series P-25. Specific publication numbers and table numbers:
  - 1961 through 1969: Number 460, Table 1.
  - 1971 through 1979: Number 957, Table 4.
  - 1981 through 1989: Number 1058, Table 3.
- 1990 through 1999: U.S. Department of Commerce, Bureau of the Census, Internet Release http://www.census.gov/popest/archives/2000s/vintage_2001/CO-EST2001-12/index.html
- 2000 forward: http://www.census.gov/popest/states/NST-ann-est.html

Table C1. Resident Population by State, 1960-1969

(Thousand People)

State	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Alabama	3,274	3,316	3,323	3,358	3,395	3,443	3,464	3,458	3,446	3,440
Alaska	229	238	246	256	263	271	271	278	285	296
Arizona	1,321	1,407	1,471	1,521	1,556	1,584	1,614	1,646	1,682	1,737
Arkansas	1,789	1,806	1,853	1,875	1,897	1,894	1,899	1,901	1,902	1,913
California	15,870	16,497	17,072	17,668	18,151	18,585	18,858	19,176	19,394	19,711
Colorado	1,769	1,844	1,899	1,936	1,970	1,985	2,007	2,053	2,120	2,166
Connecticut	2,544	2,586	2,647	2,727	2,798	2,857	2,903	2,935	2,964	3,000
Delaware	449	461	469	483	497	507	516	525	534	540
District of Columbia	765	778	788	798	798	797	791	791	778	762
Florida	5,004	5,243	5,458	5,628	5,781	5,954	6,104	6,242	6,433	6,641
Georgia	3,956	4,015	4,086	4,172	4,258	4,332	4,379	4,408	4,482	4,551
Hawaii	642	659	684	682	700	704	710	723	734	750
Idaho	671	684	692	683	680	686	689	688	695	707
Illinois	10,086	10,130	10,280	10,402	10,580	10,693	10,836	10,947	10,995	11,039
Indiana	4,674	4,730	4,736	4,799	4,856	4,922	4,999	5,053	5,093	5,143
Iowa	2,756	2,756	2,750	2,747	2,746	2,742	2,762	2,793	2,803	2,805
Kansas	2,183	2,215	2,231	2,217	2,209	2,206	2,200	2,197	2,216	2,236
Kentucky	3,041	3,054	3,079	3,096	3,129	3,140	3,147	3,172	3,195	3,198
Louisiana	3,260	3,287	3,345	3,377	3,446	3,496	3,550	3,581	3,603	3,619
Maine	975	995	994	993	993	997	999	1,004	994	992
Maryland	3,113	3,176	3,263	3,386	3,492	3,600	3,695	3,757	3,815	3,868
Massachusetts	5,160	5,219	5,263	5,344	5,448	5,502	5,535	5,594	5,618	5,650
Michigan	7,834	7,893	7,933	8,058	8,187	8,357	8,512	8,630	8,696	8,781
Minnesota	3,425	3,470	3,513	3,531	3,558	3,592	3,617	3,659	3,703	3,758
Mississippi	2,182	2,206	2,243	2,244	2,241	2,246	2,245	2,228	2,219	2,220
Missouri	4,326	4,349	4,357	4,392	4,442	4,467	4,523	4,539	4,568	4,640
Montana	679	696	698	703	706	706	707	701	700	694
Nebraska	1,417	1,446	1,464	1,476	1,482	1,471	1,456	1,457	1,467	1,474
Nevada	291	315	352	397	426	444	446	449	464	480
New Hampshire	609	618	632	649	663	676	681	697	709	724
New Jersey	6,103	6,265	6,376	6,531	6,660	6,767	6,851	6,928	7,005	7,095
New Mexico	954	965	979	989	1,006	1,012	1,007	1,000	994	1,011
New York	16,838	17,061	17,301	17,461	17,589	17,734	17,843	17,935	18,051	18,105
North Carolina	4,573	4,663	4,707	4,742	4,802	4,863	4,896	4,952	5,004	5,031
North Dakota	634	641	637	644	649	649	647	626	621	621
Ohio	9,734	9,854	9,929	9,986	10,080	10,201	10,330	10,414	10,516	10,563
Oklahoma	2,336	2,380	2,427	2,439	2,446	2,440	2,454	2,489	2,503	2,535
Oregon	1,772	1,787	1,818	1,853	1,888	1,937	1,969	1,979	2,004	2,062
Pennsylvania	11,329	11,392	11,355	11,424	11,519	11,620	11,664	11,681	11,741	11,741
Rhode Island	855	858	871	876	885	893	899	909	922	932
South Carolina	2,392	2,409	2,423	2,460	2,475	2,494	2,520	2,533	2,559	2,570
South Dakota	683	693	705	708	701	692	683	671	669	668
Tennessee	3,575	3,622	3,673	3,718	3,771	3,798	3,822	3,859	3,878	3,897
Texas	9,624	9,820	10,053	10,159	10,270	10,378	10,492	10,599	10,819	11,045
Utah	900	936	958	974	978	991	1,009	1,019	1,029	1,047
Vermont	389	390	393	397	399	404	413	423	430	437
Virginia	3,986	4,095	4,180	4,276	4,357	4,411	4,456	4,508	4,558	4,614
Washington	2,855	2,882	2,942	2,955	2,961	2,967	3,057	3,174	3,270	3,343
West Virginia	1,853	1,828	1,809	1,796	1,797	1,786	1,775	1,769	1,763	1,746
Wisconsin	3,962	4,009	4,049	4,112	4,165	4,232	4,274	4,303	4,345	4,378
Wyoming	331	337	333	336	339	332	323	322	324	329
U.S. Total	180,671	183,691	186,538	189,242	191,889	194,303	196,560	198,712	200,706	202,677

Where shown, R = Revised data.
Source: See first page of this appendix.

Table C2. Resident Population by State, 1970-1979

(Thousand People)

State	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Alabama	3,451	3,497	3,539	3,580	3,626	3,679	3,735	3,780	3,832	3,866
Alaska	304	316	324	331	341	376	401	403	405	403
Arizona	1,792	1,896	2,008	2,124	2,223	2,285	2,346	2,425	2,515	2,636
Arkansas	1,932	1,972	2,019	2,059	2,101	2,160	2,170	2,209	2,243	2,271
California	20,007	20,346	20,585	20,869	21,174	21,538	21,936	22,352	22,836	23,257
Colorado	2,223	2,304	2,405	2,496	2,541	2,586	2,632	2,696	2,767	2,849
Connecticut	3,041	3,061	3,069	3,068	3,074	3,082	3,083	3,086	3,092	3,096
Delaware	551	565	573	578	581	587	590	592	595	595
District of Columbia	756	750	742	731	718	707	692	677	665	650
Florida	6,848	7,158	7,511	7,914	8,299	8,518	8,667	8,856	9,102	9,426
Georgia	4,607	4,712	4,809	4,910	4,999	5,064	5,133	5,220	5,296	5,401
Hawaii	774	802	828	852	868	886	904	918	932	953
Idaho	718	739	763	782	808	832	857	883	911	933
Illinois	11,128	11,202	11,252	11,251	11,262	11,292	11,343	11,386	11,413	11,397
Indiana	5,202	5,253	5,302	5,338	5,362	5,366	5,389	5,426	5,470	5,501
Iowa	2,832	2,852	2,860	2,864	2,868	2,881	2,903	2,914	2,918	2,916
Kansas	2,249	2,247	2,256	2,266	2,269	2,281	2,301	2,321	2,336	2,351
Kentucky	3,231	3,298	3,336	3,371	3,416	3,468	3,529	3,574	3,610	3,642
Louisiana	3,652	3,710	3,762	3,788	3,820	3,886	3,951	4,014	4,069	4,138
Maine	997	1,015	1,034	1,046	1,059	1,072	1,088	1,104	1,114	1,123
Maryland	3,938	4,018	4,073	4,098	4,119	4,139	4,151	4,170	4,184	4,191
Massachusetts	5,706	5,738	5,760	5,781	5,774	5,758	5,744	5,738	5,736	5,738
Michigan	8,890	8,974	9,029	9,078	9,118	9,118	9,129	9,171	9,218	9,266
Minnesota	3,815	3,853	3,870	3,889	3,904	3,933	3,965	3,989	4,015	4,050
Mississippi	2,220	2,265	2,307	2,350	2,378	2,399	2,430	2,459	2,488	2,507
Missouri	4,688	4,726	4,759	4,783	4,796	4,808	4,839	4,863	4,889	4,912
Montana	698	711	719	727	736	748	757	770	782	787
Nebraska	1,488	1,505	1,519	1,530	1,539	1,543	1,551	1,557	1,564	1,567
Nevada	493	520	547	569	597	620	647	678	719	765
New Hampshire	742	762	781	801	816	829	845	870	892	909
New Jersey	7,193	7,281	7,335	7,333	7,332	7,338	7,340	7,337	7,351	7,367
New Mexico	1,023	1,054	1,079	1,106	1,131	1,160	1,189	1,216	1,238	1,285
New York	18,268	18,358	18,339	18,177	18,050	18,003	17,941	17,813	17,681	17,584
North Carolina	5,098	5,204	5,301	5,390	5,471	5,547	5,608	5,686	5,759	5,823
North Dakota	620	627	631	633	635	639	646	650	651	653
Ohio	10,664	10,735	10,747	10,767	10,766	10,770	10,753	10,771	10,796	10,798
Oklahoma	2,567	2,619	2,659	2,696	2,735	2,775	2,827	2,870	2,917	2,975
Oregon	2,101	2,151	2,197	2,242	2,285	2,330	2,378	2,447	2,518	2,588
Pennsylvania	11,813	11,886	11,908	11,891	11,871	11,906	11,897	11,894	11,879	11,888
Rhode Island	951	963	975	976	951	943	946	950	952	950
South Carolina	2,597	2,662	2,719	2,777	2,845	2,902	2,944	2,992	3,044	3,090
South Dakota	668	671	677	679	680	681	686	688	689	688
Tennessee	3,937	4,014	4,095	4,147	4,214	4,276	4,347	4,423	4,486	4,560
Texas	11,236	11,510	11,759	12,020	12,269	12,569	12,904	13,193	13,500	13,888
Utah	1,066	1,101	1,135	1,170	1,200	1,236	1,275	1,320	1,368	1,420
Vermont	446	454	463	468	473	480	485	492	498	505
Virginia	4,659	4,751	4,824	4,901	4,971	5,047	5,122	5,193	5,270	5,308
Washington	3,413	3,448	3,448	3,479	3,550	3,621	3,694	3,776	3,889	4,018
West Virginia	1,751	1,771	1,798	1,806	1,815	1,842	1,880	1,908	1,923	1,942
Wisconsin	4,429	4,462	4,502	4,524	4,546	4,579	4,596	4,627	4,646	4,683
Wyoming	334	340	347	354	366	382	397	413	433	454
U.S. Total	205,052	207,661	209,896	211,909	213,854	215,973	218,035	220,239	222,585	225,055

Where shown, R = Revised data.
Source: See first page of this appendix.

Table C3. Resident Population by State, 1980-1989

(Thousand People)

State	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Alabama	3,900	3,919	3,925	3,934	3,952	3,973	3,992	4,015	4,024	4,030
Alaska	405	418	450	488	514	532	544	539	542	547
Arizona	2,738	2,810	2,890	2,969	3,067	3,184	3,308	3,437	3,535	3,622
Arkansas	2,289	2,293	2,294	2,306	2,320	2,327	2,332	2,342	2,343	2,346
California	23,801	24,286	24,820	25,360	25,844	26,441	27,102	27,777	28,464	29,218
Colorado	2,909	2,978	3,062	3,134	3,170	3,209	3,237	3,260	3,262	3,276
Connecticut	3,113	3,129	3,139	3,162	3,180	3,201	3,224	3,247	3,272	3,283
Delaware	595	596	599	605	612	618	628	637	648	658
District of Columbia	638	637	634	632	633	635	638	637	630	624
Florida	9,840	10,193	10,471	10,750	11,040	11,351	11,668	11,997	12,306	12,638
Georgia	5,486	5,568	5,650	5,728	5,835	5,963	6,085	6,208	6,316	6,411
Hawaii	968	978	994	1,013	1,028	1,040	1,052	1,068	1,080	1,095
Idaho	948	962	974	982	991	994	990	985	986	994
Illinois	11,435	11,443	11,423	11,409	11,412	11,400	11,387	11,391	11,390	11,410
Indiana	5,491	5,480	5,468	5,450	5,458	5,459	5,454	5,473	5,492	5,524
Iowa	2,914	2,908	2,888	2,871	2,859	2,830	2,792	2,767	2,768	2,771
Kansas	2,369	2,385	2,401	2,416	2,424	2,427	2,433	2,445	2,462	2,473
Kentucky	3,664	3,670	3,683	3,694	3,695	3,695	3,688	3,683	3,680	3,677
Louisiana	4,223	4,283	4,353	4,395	4,400	4,408	4,407	4,344	4,289	4,253
Maine	1,127	1,133	1,137	1,145	1,156	1,163	1,170	1,185	1,204	1,220
Maryland	4,228	4,262	4,283	4,313	4,365	4,413	4,487	4,566	4,658	4,727
Massachusetts	5,746	5,769	5,771	5,799	5,841	5,881	5,903	5,935	5,980	6,015
Michigan	9,256	9,209	9,115	9,048	9,049	9,076	9,128	9,187	9,218	9,253
Minnesota	4,085	4,112	4,131	4,141	4,158	4,184	4,205	4,235	4,296	4,338
Mississippi	2,525	2,539	2,557	2,568	2,578	2,588	2,594	2,589	2,580	2,574
Missouri	4,922	4,932	4,929	4,944	4,975	5,000	5,023	5,057	5,082	5,096
Montana	789	795	804	814	821	822	814	805	800	800
Nebraska	1,572	1,579	1,582	1,584	1,589	1,585	1,574	1,567	1,571	1,575
Nevada	810	848	882	902	925	951	981	1,023	1,075	1,137
New Hampshire	924	937	948	958	977	997	1,025	1,054	1,083	1,105
New Jersey	7,376	7,407	7,431	7,468	7,515	7,566	7,622	7,671	7,712	7,726
New Mexico	1,309	1,333	1,364	1,394	1,417	1,438	1,463	1,479	1,490	1,504
New York	17,567	17,568	17,590	17,687	17,746	17,792	17,833	17,869	17,941	17,983
North Carolina	5,899	5,957	6,019	6,077	6,164	6,254	6,322	6,404	6,481	6,565
North Dakota	654	660	669	677	680	677	670	661	655	646
Ohio	10,801	10,788	10,757	10,738	10,738	10,735	10,730	10,760	10,799	10,829
Oklahoma	3,041	3,096	3,206	3,290	3,286	3,271	3,253	3,210	3,167	3,150
Oregon	2,641	2,668	2,665	2,653	2,667	2,673	2,684	2,701	2,741	2,791
Pennsylvania	11,868	11,859	11,845	11,838	11,815	11,771	11,783	11,811	11,846	11,866
Rhode Island	949	953	954	956	962	969	977	990	996	1,001
South Carolina	3,135	3,179	3,208	3,234	3,272	3,303	3,343	3,381	3,412	3,457
South Dakota	691	690	691	693	697	698	696	696	698	697
Tennessee	4,600	4,628	4,646	4,660	4,687	4,715	4,739	4,783	4,822	4,854
Texas	14,338	14,746	15,331	15,752	16,007	16,273	16,561	16,622	16,667	16,807
Utah	1,473	1,515	1,558	1,595	1,622	1,643	1,663	1,678	1,689	1,706
Vermont	513	516	519	523	527	530	534	540	550	558
Virginia	5,368	5,444	5,493	5,565	5,644	5,715	5,812	5,932	6,037	6,120
Washington	4,155	4,236	4,277	4,300	4,344	4,400	4,453	4,532	4,640	4,746
West Virginia	1,951	1,954	1,950	1,945	1,928	1,907	1,882	1,858	1,830	1,807
Wisconsin	4,712	4,726	4,729	4,721	4,736	4,748	4,756	4,778	4,822	4,857
Wyoming	474	492	506	510	505	500	496	477	465	458
U.S. Total	227,225	229,466	231,664	233,792	235,825	237,924	240,133	242,289	244,499	246,819

Where shown, R = Revised data.
Source: See first page of this appendix.

Table C4. Resident Population by State, 1990-1999

(Thousand People)

State	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Alabama	4,050	4,099	4,154	4,214	4,260	4,297	4,331	4,368	4,405	4,430
Alaska	553	570	589	599	603	604	609	613	620	625
Arizona	3,684	3,789	3,916	4,065	4,245	4,432	4,587	4,737	4,883	5,024
Arkansas	2,357	2,383	2,416	2,456	2,494	2,535	2,572	2,601	2,626	2,652
California	29,960	30,471	30,975	31,275	31,484	31,697	32,019	32,486	32,988	33,499
Colorado	3,308	3,387	3,496	3,614	3,724	3,827	3,920	4,018	4,117	4,226
Connecticut	3,292	3,303	3,301	3,309	3,316	3,324	3,337	3,349	3,365	3,386
Delaware	670	683	695	706	718	730	741	751	763	775
District of Columbia	605	601	598	595	589	581	572	568	565	570
Florida	13,033	13,370	13,651	13,927	14,239	14,538	14,853	15,186	15,487	15,759
Georgia	6,513	6,653	6,817	6,978	7,157	7,328	7,501	7,685	7,864	8,046
Hawaii	1,113	1,137	1,159	1,173	1,188	1,197	1,204	1,212	1,215	1,210
Idaho	1,012	1,041	1,072	1,109	1,145	1,177	1,203	1,229	1,252	1,276
Illinois	11,453	11,569	11,694	11,810	11,913	12,008	12,102	12,186	12,272	12,359
Indiana	5,558	5,616	5,675	5,739	5,794	5,851	5,906	5,955	5,999	6,045
Iowa	2,781	2,798	2,818	2,837	2,851	2,867	2,880	2,891	2,903	2,918
Kansas	2,481	2,499	2,532	2,557	2,581	2,601	2,615	2,635	2,661	2,678
Kentucky	3,694	3,722	3,765	3,812	3,849	3,887	3,920	3,953	3,985	4,018
Louisiana	4,222	4,253	4,293	4,316	4,347	4,379	4,399	4,421	4,440	4,461
Maine	1,232	1,237	1,239	1,242	1,243	1,243	1,249	1,255	1,259	1,267
Maryland	4,800	4,868	4,923	4,972	5,023	5,070	5,112	5,157	5,204	5,255
Massachusetts	6,023	6,018	6,029	6,061	6,095	6,141	6,180	6,226	6,272	6,317
Michigan	9,311	9,400	9,479	9,540	9,598	9,676	9,759	9,809	9,848	9,897
Minnesota	4,390	4,441	4,496	4,556	4,610	4,660	4,713	4,763	4,813	4,873
Mississippi	2,579	2,599	2,624	2,655	2,689	2,723	2,748	2,777	2,805	2,828
Missouri	5,129	5,171	5,217	5,271	5,324	5,378	5,432	5,481	5,522	5,562
Montana	800	810	826	845	861	877	886	890	892	898
Nebraska	1,582	1,596	1,612	1,626	1,639	1,657	1,674	1,686	1,696	1,705
Nevada	1,221	1,296	1,351	1,411	1,499	1,582	1,666	1,764	1,853	1,935
New Hampshire	1,112	1,110	1,118	1,129	1,143	1,158	1,175	1,189	1,206	1,222
New Jersey	7,763	7,815	7,881	7,949	8,014	8,083	8,150	8,219	8,287	8,360
New Mexico	1,522	1,555	1,595	1,636	1,682	1,720	1,752	1,775	1,793	1,808
New York	18,021	18,123	18,247	18,375	18,459	18,524	18,588	18,657	18,756	18,883
North Carolina	6,664	6,784	6,897	7,043	7,187	7,345	7,501	7,657	7,809	7,949
North Dakota	638	636	638	641	645	648	650	650	648	644
Ohio	10,864	10,946	11,029	11,101	11,152	11,203	11,243	11,277	11,312	11,335
Oklahoma	3,149	3,175	3,221	3,252	3,281	3,308	3,340	3,373	3,405	3,437
Oregon	2,860	2,929	2,992	3,060	3,121	3,184	3,247	3,304	3,352	3,394
Pennsylvania	11,903	11,982	12,049	12,120	12,166	12,198	12,220	12,228	12,246	12,264
Rhode Island	1,006	1,011	1,013	1,015	1,016	1,017	1,021	1,025	1,031	1,040
South Carolina	3,501	3,570	3,620	3,663	3,705	3,749	3,796	3,860	3,919	3,975
South Dakota	697	704	713	722	731	738	742	744	746	750
Tennessee	4,894	4,967	5,050	5,138	5,231	5,327	5,417	5,499	5,570	5,639
Texas	17,057	17,398	17,760	18,162	18,564	18,959	19,340	19,740	20,158	20,558
Utah	1,731	1,780	1,837	1,898	1,960	2,014	2,068	2,120	2,166	2,203
Vermont	565	569	573	578	584	589	594	597	600	605
Virginia	6,217	6,301	6,414	6,510	6,593	6,671	6,751	6,829	6,901	7,000
Washington	4,903	5,026	5,161	5,279	5,375	5,481	5,570	5,675	5,770	5,843
West Virginia	1,793	1,799	1,806	1,818	1,820	1,824	1,823	1,819	1,816	1,812
Wisconsin	4,905	4,964	5,025	5,085	5,134	5,185	5,230	5,266	5,298	5,333
Wyoming	454	459	466	473	480	485	488	489	491	492
U.S. Total	249,623	252,981	256,514	259,919	263,126	266,278	269,394	272,647	275,854	279,040

Where shown, R = Revised data.
Source: See first page of this appendix.

Table C5. Resident Population by State, 2000-2008

(Thousand People)

State	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	R 4,452	R 4,464	R 4,472	R 4,491	R 4,512	R 4,545	R 4,598	R 4,638	4,677
Alaska	R 627	R 633	R 643	R 651	R 662	R 669	R 677	R 682	688
Arizona	R 5,167	R 5,304	R 5,452	R 5,591	R 5,759	R 5,975	R 6,192	R 6,362	6,499
Arkansas	R 2,678	R 2,691	R 2,705	R 2,722	R 2,746	R 2,776	R 2,815	R 2,842	2,868
California	R 33,995	R 34,486	R 34,876	R 35,251	R 35,558	R 35,795	R 35,979	R 36,226	36,580
Colorado	R 4,328	R 4,433	R 4,504	R 4,549	R 4,600	R 4,661	R 4,753	R 4,842	4,935
Connecticut	R 3,412	R 3,428	R 3,448	R 3,468	R 3,475	R 3,477	R 3,485	R 3,489	3,503
Delaware	R 786	R 795	R 804	R 815	R 827	R 840	R 853	R 865	876
District of Columbia	R 572	R 578	R 580	R 578	R 580	582	R 584	R 586	590
Florida	R 16,047	R 16,354	R 16,680	R 16,981	R 17,375	R 17,784	R 18,089	R 18,278	18,424
Georgia	R 8,230	R 8,420	R 8,586	R 8,735	R 8,914	R 9,097	R 9,330	R 9,534	9,698
Hawaii	R 1,212	R 1,218	R 1,228	R 1,239	R 1,253	R 1,266	R 1,276	R 1,277	1,287
Idaho	R 1,300	R 1,321	R 1,342	R 1,364	R 1,392	R 1,426	R 1,464	R 1,499	1,528
Illinois	R 12,438	R 12,508	R 12,558	R 12,598	R 12,645	R 12,674	R 12,718	R 12,779	12,843
Indiana	R 6,092	R 6,125	R 6,149	R 6,182	R 6,214	R 6,253	R 6,302	R 6,346	6,388
Iowa	R 2,928	R 2,929	R 2,929	R 2,933	R 2,941	R 2,949	R 2,964	R 2,979	2,994
Kansas	R 2,693	R 2,701	R 2,713	R 2,722	R 2,731	R 2,742	R 2,756	R 2,776	2,797
Kentucky	R 4,049	R 4,069	R 4,091	R 4,119	R 4,148	R 4,182	R 4,219	R 4,256	4,288
Louisiana	R 4,469	R 4,461	R 4,466	R 4,475	R 4,489	R 4,498	R 4,240	R 4,376	4,452
Maine	R 1,277	R 1,285	R 1,294	R 1,303	R 1,308	R 1,312	R 1,315	R 1,317	1,320
Maryland	R 5,311	R 5,375	R 5,440	R 5,497	R 5,543	R 5,583	R 5,612	R 5,634	5,659
Massachusetts	R 6,363	R 6,412	R 6,441	R 6,452	R 6,451	R 6,453	R 6,466	R 6,499	6,544
Michigan	R 9,955	R 10,006	R 10,039	R 10,066	R 10,089	R 10,091	R 10,082	R 10,051	10,002
Minnesota	R 4,934	R 4,983	R 5,017	R 5,048	R 5,079	R 5,107	R 5,148	R 5,191	5,231
Mississippi	R 2,848	R 2,853	R 2,859	R 2,868	R 2,886	R 2,900	R 2,897	R 2,922	2,940
Missouri	R 5,606	R 5,644	R 5,681	R 5,715	R 5,758	R 5,807	R 5,862	R 5,910	5,956
Montana	R 903	R 906	R 910	R 917	R 926	R 935	R 946	R 957	968
Nebraska	R 1,713	R 1,718	R 1,725	R 1,734	R 1,742	R 1,752	R 1,760	R 1,770	1,782
Nevada	R 2,018	R 2,095	R 2,166	R 2,237	R 2,329	R 2,409	R 2,493	R 2,568	2,616
New Hampshire	R 1,240	R 1,257	R 1,271	R 1,282	R 1,293	R 1,301	R 1,312	R 1,317	1,322
New Jersey	R 8,431	R 8,489	R 8,544	R 8,583	R 8,612	R 8,622	R 8,624	R 8,636	8,663
New Mexico	R 1,821	R 1,829	R 1,850	R 1,870	R 1,892	R 1,917	R 1,943	R 1,969	1,987
New York	R 18,998	R 19,089	R 19,162	R 19,231	R 19,298	R 19,331	R 19,357	R 19,423	19,468
North Carolina	R 8,079	R 8,203	R 8,317	R 8,416	R 8,531	R 8,669	R 8,867	R 9,064	9,247
North Dakota	R 641	R 636	R 634	R 633	R 636	R 635	R 637	R 638	641
Ohio	R 11,364	R 11,397	R 11,421	R 11,445	R 11,465	R 11,475	R 11,492	R 11,521	11,528
Oklahoma	R 3,454	R 3,465	R 3,485	R 3,499	R 3,514	R 3,533	R 3,574	R 3,612	3,644
Oregon	R 3,431	R 3,470	R 3,517	R 3,550	R 3,574	R 3,618	R 3,678	R 3,733	3,783
Pennsylvania	R 12,286	R 12,300	R 12,326	R 12,358	R 12,388	R 12,418	R 12,471	R 12,523	12,566
Rhode Island	R 1,051	R 1,058	R 1,066	R 1,072	R 1,071	R 1,065	R 1,060	R 1,055	1,054
South Carolina	R 4,024	R 4,063	R 4,104	R 4,146	R 4,201	R 4,256	R 4,339	R 4,424	4,503
South Dakota	R 756	R 759	R 762	R 767	R 774	R 780	R 789	R 797	805
Tennessee	R 5,703	R 5,755	R 5,803	R 5,857	R 5,917	R 5,996	R 6,089	R 6,173	6,240
Texas	R 20,946	R 21,333	R 21,711	R 22,058	R 22,418	R 22,802	R 23,369	R 23,838	24,304
Utah	R 2,244	R 2,291	R 2,334	R 2,380	R 2,439	R 2,500	R 2,584	R 2,664	2,727
Vermont	R 610	R 612	R 615	R 617	R 618	R 619	R 620	R 620	621
Virginia	R 7,105	R 7,191	R 7,284	R 7,374	R 7,469	R 7,564	R 7,647	R 7,720	7,795
Washington	R 5,911	R 5,988	R 6,056	R 6,113	R 6,184	R 6,261	R 6,372	R 6,465	6,566
West Virginia	R 1,807	R 1,799	R 1,799	R 1,802	R 1,803	R 1,804	R 1,807	R 1,811	1,815
Wisconsin	R 5,374	R 5,409	R 5,447	R 5,477	R 5,511	R 5,541	R 5,572	R 5,602	5,628
Wyoming	R 494	R 493	R 497	R 499	R 503	R 506	R 513	R 523	533
U.S. Total	R 282,172	R 285,082	R 287,804	R 290,326	R 293,046	R 295,753	R 298,593	R 301,580	304,375

Where shown, R = Revised data.
Source: See first page of this appendix.

Appendix D

Real Gross Domestic Product by State

The real gross domestic product (GDP) data used in the U.S. Energy Information Administration State Energy Data System to calculate total energy consumed per chained (2000) dollar of output are shown in Tables F1 through F4. The data are the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), real GDP estimates by State, beginning in 1977. The estimates are released June of each year.

For 1977 through 1989, BEA does not provide the real GDP by State estimates. However, BEA's quantity indexes for real GDP by State (2000=100.000) are used to calculate real GDP from 1977 to 1989. For 1990 through 1996, BEA reports real GDP by State based on the Standard Industrial Classification (SIC). For 1997 forward, BEA reports real GDP by State based on the North American Industry Classification System (NAICS). Given this discontinuity in the GDP by States series at 1997, users of these data are strongly cautioned against appending the two data series in an attempt to construct a single time series of GDP by State estimates.

The U.S real GDP is extracted from the same data source as the State data. This series does not match the national account GDP series. For details, see BEA Regional Economic Accounts: Methodologies, http://www.bea.gov/regional/methods.cfm.

Data Sources

GDPRXUS — Real gross domestic product of the United States in million chained (2000) dollars.

- 1977 through 1996: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=SIC.
- 1997 forward: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=NAICS.

GDPRXZZ — Real gross domestic product by State in million chained (2000) dollars.

- 1977 through 1996: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=SIC.
- 1997 forward: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/default.cfm?series=NAICS.

Table D1. Real Gross Domestic Product by State, 1977-1979

(Billion Chained (2000) Dollars)

State	1977	1978	1979
Alabama	61.4	65.4	67.1
Alaska	18.9	20.6	21.7
Arizona	44.6	49.3	54.1
Arkansas	32.9	35.3	35.8
California	539.8	576.8	598.7
Colorado	61.2	66.2	70.7
Connecticut	72.3	76.1	79.0
Delaware	16.8	17.6	17.7
District of Columbia	46.2	47.5	48.1
Florida	165.1	179.4	191.6
Georgia	96.5	102.4	107.2
Hawaii	25.5	26.5	28.0
Idaho	14.3	15.5	15.8
Illinois	264.8	276.1	280.1
Indiana	105.1	110.2	110.6
Iowa	53.4	56.5	57.6
Kansas	47.9	49.2	52.2
Kentucky	62.6	65.4	67.0
Louisiana	104.3	109.4	108.1
Maine	18.6	19.1	19.6
Maryland	91.0	94.7	97.1
Massachusetts	117.8	124.1	128.6
Michigan	207.6	215.5	213.1
Minnesota	81.3	85.5	89.5
Mississippi	35.9	37.1	38.5
Missouri	98.0	102.8	105.4
Montana	14.6	15.7	15.7
Nebraska	29.5	31.3	32.2
Nevada	19.9	22.3	24.0
New Hampshire	13.9	15.3	16.2
New Jersey	161.8	168.6	175.2
New Mexico	22.6	23.9	24.1
New York	441.4	459.2	467.9
North Carolina	107.7	114.6	118.0
North Dakota	11.5	12.8	13.2
Ohio	219.2	227.3	230.8
Oklahoma	56.8	59.3	62.2
Oregon	47.6	50.7	52.8
Pennsylvania	237.2	246.2	250.9
Rhode Island	18.2	18.7	19.3
South Carolina	45.5	48.8	51.0
South Dakota	11.0	11.7	12.3
Tennessee	77.6	82.9	85.6
Texas	317.2	335.2	346.8
Utah	24.8	26.7	28.1
Vermont	7.5	8.3	8.6
Virginia	115.1	120.6	124.6
Washington	90.4	97.7	104.0
West Virginia	30.4	31.0	31.3
Wisconsin	88.9	93.1	96.2
Wyoming	12.0	13.1	13.7
U.S. Total	4,711.5	4,965.4	5,113.0

Where shown, R = Revised data.
Source: See first page of this appendix.

Table D2. Real Gross Domestic Product by State, 1980-1989

(Billion Chained (2000) Dollars)

State	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Alabama	66.8	68.0	66.2	69.3	73.0	76.6	77.5	81.8	85.2	85.2
Alaska	24.9	28.6	29.5	28.8	30.1	33.4	27.4	32.0	31.0	32.1
Arizona	55.6	56.8	55.3	58.4	65.0	69.7	73.9	76.7	79.8	80.3
Arkansas	35.3	36.5	35.5	36.6	39.6	40.1	40.8	42.1	43.7	44.7
California	613.5	633.6	634.0	659.2	719.0	760.3	790.7	838.6	887.9	925.9
Colorado	73.1	76.3	77.9	78.9	83.6	85.7	84.5	86.0	87.9	89.0
Connecticut	80.6	82.4	84.2	88.2	96.0	101.0	106.0	114.6	122.1	123.9
Delaware	17.4	17.7	18.0	19.4	20.9	22.3	22.9	24.5	25.6	27.4
District of Columbia	47.9	47.2	46.1	46.5	47.7	48.6	49.0	50.6	52.7	53.9
Florida	201.8	211.3	214.7	227.4	246.6	259.6	270.0	287.2	303.7	314.5
Georgia	108.4	112.6	114.1	121.5	134.1	144.6	152.8	159.9	166.5	169.6
Hawaii	28.8	28.2	28.2	29.2	30.2	31.0	32.0	33.5	35.5	37.9
Idaho	15.9	16.0	15.4	16.0	16.4	16.9	16.5	16.9	17.8	18.9
Illinois	271.0	274.2	264.8	266.8	286.8	294.8	300.8	310.7	327.1	333.0
Indiana	104.6	105.9	99.9	102.1	111.7	114.1	115.9	120.2	125.9	130.6
Iowa	56.5	58.5	54.7	52.1	55.6	57.1	56.3	57.5	60.5	62.8
Kansas	51.5	53.1	52.7	52.8	55.3	57.6	57.6	59.4	60.7	61.1
Kentucky	65.2	67.1	64.8	64.5	69.9	72.4	72.2	75.1	78.2	80.4
Louisiana	111.4	114.9	110.6	109.3	115.8	117.8	115.0	114.5	120.3	119.6
Maine	20.0	20.2	20.5	21.4	23.0	24.2	25.3	27.0	29.1	29.6
Maryland	97.5	99.7	98.9	103.7	111.7	118.8	124.8	131.5	140.4	143.8
Massachusetts	131.2	134.9	136.0	144.1	158.4	168.7	177.7	190.0	201.0	201.9
Michigan	193.8	194.3	182.0	194.0	210.7	220.5	224.5	226.7	235.0	238.2
Minnesota	89.2	91.9	90.5	92.9	102.8	107.2	108.0	113.2	117.1	120.6
Mississippi	37.8	39.2	37.9	38.7	41.4	42.7	42.6	45.1	46.3	46.6
Missouri	101.4	102.4	101.1	104.2	113.6	115.4	118.5	122.4	127.3	129.7
Montana	15.8	16.4	15.8	15.7	15.9	15.6	15.4	15.5	15.3	15.9
Nebraska	31.8	33.7	33.0	32.1	34.7	36.2	35.5	35.5	37.5	38.7
Nevada	24.7	25.6	25.3	26.0	27.4	28.6	30.0	31.8	34.6	37.5
New Hampshire	16.7	17.3	17.6	18.7	21.1	23.2	24.8	27.7	29.1	28.9
New Jersey	175.7	179.7	179.8	192.0	207.9	219.1	229.4	244.2	262.6	265.8
New Mexico	25.0	25.4	25.0	25.4	26.8	27.9	27.4	27.3	27.6	28.2
New York	468.5	477.0	482.5	493.6	528.0	542.4	558.5	585.8	619.2	620.4
North Carolina	118.6	122.5	119.8	126.1	137.6	146.6	152.2	158.5	167.5	172.8
North Dakota	12.7	14.6	14.1	13.7	14.1	14.2	13.2	13.5	12.4	13.1
Ohio	221.5	223.4	212.0	220.2	240.0	249.0	251.2	257.6	266.7	271.9
Oklahoma	65.2	69.1	71.2	67.8	71.2	72.4	67.8	66.2	69.6	69.5
Oregon	52.3	50.6	47.8	48.2	51.4	52.8	53.8	55.3	58.9	60.7
Pennsylvania	246.0	247.0	237.9	243.9	258.1	264.7	269.6	283.6	296.1	301.3
Rhode Island	19.4	19.8	19.7	20.2	21.8	23.1	24.2	25.2	26.9	27.5
South Carolina	51.3	53.1	52.1	55.4	61.0	63.3	66.2	70.6	74.3	76.7
South Dakota	11.8	12.4	12.1	11.9	12.9	13.4	13.6	13.9	14.0	14.2
Tennessee	84.7	86.8	84.9	89.4	96.3	100.2	103.4	110.2	114.7	116.0
Texas	359.6	381.6	383.5	383.4	407.8	425.8	412.8	409.7	436.6	447.8
Utah	28.7	29.8	29.6	30.6	33.1	35.1	34.6	34.7	36.3	36.9
Vermont	8.9	9.2	9.1	9.5	10.0	10.6	11.1	12.0	13.1	13.6
Virginia	126.6	130.4	130.7	136.6	146.7	154.2	162.1	171.5	179.6	185.8
Washington	104.4	107.1	106.9	109.2	113.0	114.2	118.9	123.3	130.5	137.2
West Virginia	31.3	30.9	30.1	28.9	30.6	30.9	31.0	31.4	32.4	32.7
Wisconsin	94.8	95.0	93.0	94.6	100.6	104.3	105.9	108.4	114.9	117.0
Wyoming	15.0	15.6	14.8	13.9	14.7	14.9	14.2	13.9	14.4	14.5
U.S. Total	5,116.1	5,252.3	5,185.7	5,331.7	5,739.4	5,981.2	6,104.0	6,357.9	6,684.4	6,837.5

Where shown, R = Revised data.
Source: See first page of this appendix.

Table D3. Real Gross Domestic Product by State, 1990-1999

(Billion Chained (2000) Dollars)

State	1990	1991	1992	1993	1994	1995	1996[a]	1997[a]	1998	1999
Alabama	86.6	88.8	92.6	93.7	97.1	100.2	103.2	107.6	110.7	114.4
Alaska	31.9	28.6	28.9	28.6	28.5	29.9	29.5	28.1	26.8	27.1
Arizona	81.1	81.8	88.1	91.7	100.2	107.5	116.1	127.4	138.7	149.7
Arkansas	45.1	47.1	49.8	51.1	53.9	56.1	58.4	62.5	64.3	67.1
California	955.9	937.4	936.3	927.1	937.9	971.3	1,007.4	1,043.5	1,108.7	1,196.6
Colorado	91.3	93.6	98.9	104.7	111.2	117.2	123.4	137.9	147.9	159.4
Connecticut	124.6	121.4	122.7	121.6	124.0	131.3	135.1	144.9	150.8	153.3
Delaware	28.1	29.0	29.2	29.1	30.1	31.7	32.3	38.3	38.8	40.8
District of Columbia	55.1	54.0	54.6	55.2	54.9	53.2	52.2	54.7	55.1	58.4
Florida	320.5	321.6	332.2	343.5	357.4	369.6	387.7	414.7	435.6	453.3
Georgia	172.1	174.0	183.6	191.1	204.1	215.5	229.7	250.8	266.0	282.8
Hawaii	41.0	41.4	42.3	41.9	41.3	40.8	40.4	40.4	39.6	39.7
Idaho	19.6	20.0	21.3	23.1	24.8	26.9	27.7	28.8	30.0	32.8
Illinois	336.3	335.6	347.5	353.3	373.6	384.2	397.3	425.0	440.0	452.9
Indiana	131.0	131.0	139.1	143.3	151.2	155.8	161.9	176.9	185.2	189.3
Iowa	64.5	64.8	67.6	67.6	73.0	74.8	78.8	85.7	86.4	87.6
Kansas	62.4	63.0	64.6	64.9	67.8	68.5	71.4	76.1	79.4	80.8
Kentucky	81.3	81.8	86.6	88.9	94.3	97.6	101.1	111.6	113.2	115.7
Louisiana	121.7	121.4	113.1	115.0	124.4	130.7	131.8	128.9	134.7	137.0
Maine	29.3	28.3	28.6	28.6	29.2	29.8	30.6	33.4	33.4	34.3
Maryland	145.2	142.4	142.4	144.4	148.8	150.8	154.0	162.7	168.9	175.4
Massachusetts	195.7	189.9	192.1	194.5	203.3	209.8	220.4	227.1	240.6	255.2
Michigan	234.2	230.1	238.8	247.5	267.9	268.3	277.6	317.3	323.1	333.0
Minnesota	121.5	121.7	128.3	128.3	135.8	139.6	148.4	163.1	170.6	176.3
Mississippi	46.7	47.7	49.9	51.8	54.9	57.5	59.0	61.6	63.3	64.7
Missouri	128.0	129.7	133.0	132.9	140.7	147.7	153.2	168.2	171.7	172.9
Montana	16.2	16.6	17.3	18.0	18.6	18.6	18.9	20.1	20.6	20.9
Nebraska	40.3	41.5	43.2	43.4	46.5	47.3	50.0	52.8	53.7	54.4
Nevada	40.5	41.3	43.9	47.1	51.3	54.5	59.4	64.5	66.9	70.7
New Hampshire	27.7	27.9	29.2	29.6	30.9	33.2	35.7	36.6	39.6	40.6
New Jersey	266.6	265.0	272.3	276.2	281.7	288.4	300.9	316.1	325.8	334.1
New Mexico	28.7	31.8	33.5	36.8	41.1	41.7	43.4	45.8	46.3	50.1
New York	624.3	606.0	614.3	616.9	627.1	640.1	665.7	671.0	698.9	736.5
North Carolina	173.6	173.3	182.6	187.7	200.8	210.7	218.4	239.7	251.0	267.0
North Dakota	13.5	13.5	14.5	14.3	15.2	15.5	16.6	17.0	17.5	17.2
Ohio	274.9	272.7	283.8	285.6	300.5	310.4	319.4	350.6	362.7	368.5
Oklahoma	70.0	70.2	71.8	73.3	74.5	75.9	79.6	82.9	84.5	86.9
Oregon	63.2	64.2	66.3	69.6	73.1	77.5	88.1	95.6	100.9	104.3
Pennsylvania	305.2	305.7	316.0	320.4	327.1	337.5	345.2	362.9	376.2	384.4
Rhode Island	27.2	26.3	26.7	27.1	27.3	28.1	28.7	30.4	30.9	31.6
South Carolina	79.0	79.4	81.3	83.9	88.2	91.3	93.8	103.3	107.1	110.9
South Dakota	14.9	15.7	16.4	17.3	18.0	18.4	19.3	20.2	21.1	21.8
Tennessee	115.5	119.2	127.9	133.1	140.9	145.2	149.4	163.0	168.2	173.6
Texas	462.0	469.4	488.3	505.8	530.4	554.8	585.8	627.5	666.6	699.1
Utah	38.8	40.3	41.7	43.7	46.9	50.2	55.0	60.1	63.0	65.6
Vermont	13.8	13.3	14.0	14.2	14.6	14.6	15.2	15.5	16.2	17.0
Virginia	187.9	186.5	190.1	194.8	201.6	206.6	215.1	226.0	237.6	248.6
Washington	145.6	148.9	154.8	159.0	163.8	164.8	173.1	188.5	204.3	219.6
West Virginia	33.2	33.5	34.7	35.6	37.6	38.5	39.3	40.6	40.8	42.0
Wisconsin	119.1	120.7	127.0	131.7	138.1	140.8	147.2	160.2	166.9	172.4
Wyoming	15.2	15.5	15.5	15.9	16.2	16.6	17.1	16.0	16.1	17.0
U.S. Total	6,939.7	6,917.7	7,114.7	7,240.8	7,538.5	7,784.2	8,106.7	8,621.0	9,004.7	9,404.3

[a] There is a discontinuity in the gross domestic product (GDP) by State time series at 1997, where the data changes from Standard Industrial Classification (SIC) industry definitions to North American Industry Classification System (NAICS) industry definitions. Users of the GDP by State estimates are strongly cautioned against appending the two data series in an attempt to construct a single time series of GDP by State estimates.

Where shown, R = Revised data.

Source: See first page of this appendix.

Table D4. Real Gross Domestic Product by State, 2000-2008

(Billion Chained (2000) Dollars)

State	2000	2001	2002	2003	2004	2005	2006	2007	2008
Alabama	114.6	115.6	118.2	121.6	127.8	132.3	134.9	136.1	137.1
Alaska	27.0	25.8	28.0	27.4	28.9	29.3	30.6	30.6	30.0
Arizona	158.5	163.4	166.9	174.2	180.5	196.2	208.6	211.6	210.2
Arkansas	66.8	67.0	68.9	70.8	74.2	76.5	77.5	78.7	79.2
California	1,287.1	1,281.7	1,298.8	1,337.8	1,406.8	1,467.9	1,512.9	1,539.4	1,546.1
Colorado	171.9	174.8	175.5	176.5	180.6	188.4	193.4	197.3	203.0
Connecticut	160.4	161.2	158.6	159.5	165.8	169.1	174.3	178.5	177.7
Delaware	41.5	43.0	42.9	44.9	46.7	49.9	49.6	50.1	49.2
District of Columbia	58.7	61.6	62.8	64.7	67.5	70.0	71.4	72.6	74.8
Florida	471.3	484.9	497.3	520.4	548.6	589.3	613.6	613.4	603.5
Georgia	290.9	292.8	294.1	299.7	310.7	322.6	326.5	331.3	329.5
Hawaii	40.2	40.6	41.1	42.6	44.6	46.9	48.7	49.4	49.8
Idaho	35.0	35.2	35.7	36.5	39.6	42.9	43.8	45.5	45.5
Illinois	464.2	464.9	466.2	479.3	487.6	490.3	505.3	514.8	516.1
Indiana	194.4	190.3	196.8	203.5	209.5	208.1	208.3	211.1	209.9
Iowa	90.2	89.4	92.8	95.3	100.9	102.6	104.5	108.1	110.4
Kansas	82.8	83.9	85.3	86.7	88.3	90.0	93.1	96.0	98.1
Kentucky	111.9	112.2	115.5	117.2	119.9	122.9	125.8	127.0	127.0
Louisiana	131.5	129.2	129.7	131.9	139.3	140.3	143.1	144.4	144.9
Maine	35.5	36.2	36.7	37.3	38.9	39.0	39.4	39.8	40.3
Maryland	180.4	187.5	193.5	198.0	205.5	211.4	214.2	217.9	220.9
Massachusetts	274.9	276.6	275.0	280.9	286.5	289.9	297.6	306.5	312.5
Michigan	337.2	326.9	336.9	341.1	337.9	339.9	334.8	331.0	326.1
Minnesota	185.1	186.3	191.1	196.7	205.1	208.4	209.4	212.8	217.0
Mississippi	64.3	64.0	64.6	66.6	67.9	68.4	69.6	70.5	71.7
Missouri	176.7	177.8	179.9	183.2	186.4	189.1	188.8	191.2	193.8
Montana	21.4	21.7	22.2	23.3	24.0	25.2	25.8	26.8	27.3
Nebraska	55.5	55.8	56.9	59.9	60.9	62.2	63.8	65.7	66.6
Nevada	73.7	75.1	77.1	81.6	89.9	97.2	101.1	103.9	103.2
New Hampshire	43.5	43.6	44.6	45.9	47.7	48.5	49.3	49.6	50.6
New Jersey	344.8	355.1	357.9	366.6	375.8	379.1	384.6	388.0	390.4
New Mexico	50.7	50.9	51.6	53.7	56.9	57.6	59.0	60.2	61.4
New York	777.2	794.4	791.7	808.4	829.9	865.7	912.9	949.5	964.8
North Carolina	273.7	278.3	282.4	286.4	295.6	309.7	326.9	329.1	329.4
North Dakota	17.8	17.9	18.8	19.9	20.0	20.9	21.1	22.6	24.3
Ohio	372.0	365.7	373.5	378.7	387.4	390.6	387.3	388.3	385.6
Oklahoma	89.8	91.8	92.9	94.3	97.3	99.2	102.2	104.1	106.9
Oregon	112.4	110.5	115.0	117.9	125.9	129.4	139.6	144.8	147.1
Pennsylvania	389.6	395.6	403.0	411.6	416.2	422.5	431.0	438.9	443.7
Rhode Island	33.6	34.2	34.9	36.5	37.8	37.8	38.5	38.5	38.1
South Carolina	112.5	114.1	115.7	119.6	119.9	122.8	125.2	126.3	127.1
South Dakota	23.1	23.4	25.3	25.7	26.6	27.4	27.1	29.3	30.3
Tennessee	174.9	176.3	183.2	188.5	197.2	200.9	206.4	209.1	210.2
Texas	727.2	745.3	760.6	771.0	806.0	828.4	869.4	907.4	925.5
Utah	67.6	68.3	69.1	70.2	73.0	77.8	82.7	86.5	87.7
Vermont	17.8	18.5	18.9	19.6	20.3	20.7	21.0	21.3	21.7
Virginia	260.7	269.6	271.2	281.5	294.2	309.3	314.5	320.3	324.5
Washington	222.0	220.2	221.1	225.0	230.0	241.8	248.5	259.4	264.6
West Virginia	41.5	41.9	42.5	42.6	43.8	44.7	44.9	45.2	46.3
Wisconsin	175.7	177.4	180.3	184.1	188.0	191.7	195.0	197.0	198.3
Wyoming	17.3	18.1	18.4	18.8	19.0	19.3	20.7	20.8	21.8
U.S. Total	9,749.1	9,836.6	9,981.8	10,225.7	10,580.2	10,912.2	11,218.8	11,439.2	11,523.6

Where shown, R = Revised data.
Source: See first page of this appendix.

Appendix E

Metric and Other Physical Conversion Factors

Data presented in the State Energy Data System are expressed predominately in units that historically have been used in the United States, such as British thermal units, barrels, cubic feet, and short tons. However, because U.S. commerce involves other nations, most of which use metric units of measure, the U.S. Government is committed to the transition to the metric system, as stated in the Metric Conversion Act of 1975 (Public Law 94–168), amended by the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100–418), and Executive Order 12770 of July 25, 1991.

The metric conversion factors presented in Table D1 can be used to calculate the metric-unit equivalents of values expressed in U.S. customary units. For example, 500 short tons are the equivalent of 453.6 metric tons (500 short tons x 0.9071847 metric tons/short ton = 453.6 metric tons).

In the metric system of weights and measures, the names of multiples and subdivisions of any unit may be derived by combining the name of the unit with prefixes, such as deka, hecto, and kilo, meaning, respectively, 10, 100, 1,000, and deci, centi, and milli, meaning, respectively, one-tenth, one-hundredth, and one-thousandth. Common metric prefixes can be found in Table D2.

The conversion factors presented in Table D3 can be used to calculate equivalents in various physical units commonly used in energy analyses. For example, 10 barrels are the equivalent of 420 U.S. gallons (10 barrels x 42 gallons/barrel = 420 gallons).

Table E1. Metric Conversion Factors

U.S. Unit	*multiplied by*	Conversion Factor	*equals*	Metric Unit
Mass				
short tons (2,000 lb)	x	0.907 184 7	=	metric tons (t)
long tons	x	1.016 047	=	metric tons (t)
pounds (lb)	x	0.453 592 37[a]	=	kilograms (kg)
pounds uranium oxide (lb U_3O_8)	x	0.384 647[b]	=	kilograms uranium (kgU)
ounces, avoirdupois (avdp oz)	x	28.349 52	=	grams (g)
Length				
miles (mi)	x	1.609 344[a]	=	kilometers (km)
yard (yd)	x	0.914 4[a]	=	meters (m)
feet (ft)	x	0.304 8[a]	=	meters (m)
inches (in)	x	2.54[a]	=	centimeters (cm)
Energy				
British Thermal Units (Btu)	x	1,055.055 852 62[a,c]	=	joules (J)
calories (cal)	x	4.186 8[a]	=	joules (J)
kilowatthours (kWh)	x	3.6[a]	=	megajoules (MJ)

U.S. Unit	*multiplied by*	Conversion Factor	*equals*	Metric Unit
Volume				
barrels of oil (bbl)	x	0.158 987 3	=	cubic meters (cm^3)
cubic yards (yd^3)	x	0.764 555	=	cubic meters (cm^3)
cubic feet (ft^3)	x	0.028 316 85	=	cubic meters (cm^3)
U.S. gallons (gal)	x	3.785 412	=	liters (L)
ounces, fluid (fl oz)	x	29.573 53	=	milliliters (mL)
cubic inches (in^3)	x	16.387 06	=	milliliters (mL)
Area				
acres	x	0.404 69	=	hectares (ha)
square miles (mi^2)	x	2.589 988	=	square kilometers (km^2)
square yards (yd^2)	x	0.836 127 4	=	square meters (m^2)
square feet (ft^2)	x	0.092 903 04[a]	=	square meters (m^2)
square inches (in^2)	x	6.451 6[a]	=	square centimeters (cm^2)
Temperature				
degrees Fahrenheit (°F)	x	5/9 (after subtracting 32)[a,d]	=	degrees Celsius (°C)

[a]Exact conversion.

[b]Calculated by the U.S. Energy Information Administration.

[c]The Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.

[d]To convert degrees Celsius (°C) to degrees Fahrenheit (°F) exactly, multiply by 9/5, then add 32.

Notes: • Spaces have been inserted after every third digit to the right of the decimal for ease of reading. • Most metric units shown belong to the International System of Units (SI), and the liter, hectare, and metric ton are accepted for use with the SI units. For more information about the SI units, contact Dr. Barry Taylor at Building 221, Room B160, National Institute of Standards and Technology, Gaithersburg, MD 20899, or on telephone number 301–975–4220.

Sources: General Services Administration, Federal Standard 376B, *Preferred Metric Units for General Use by the Federal Government* (Washington, DC, January 27, 1993), pp. 9–11, 13, and 16. National Institute of Standards and Technology, Special Publications 330, 811, and 814. American National Standards Institute/Institute of Electrical and Electronic Engineers, ANSI/IEEE Std 268–1992, pp. 28 and 29.

Table E2. Metric Prefixes

Unit Multiple	Prefix	Symbol	Unit Subdivision	Prefix	Symbol
10^{1}	deka	da	10^{-1}	deci	d
10^{2}	hecto	h	10^{-2}	centi	c
10^{3}	kilo	k	10^{-3}	milli	m
10^{6}	mega	M	10^{-6}	micro	μ
10^{9}	giga	G	10^{-9}	nano	n
10^{12}	tera	T	10^{-12}	pico	p
10^{15}	peta	P	10^{-15}	femto	f
10^{18}	exa	E	10^{-18}	atto	a
10^{21}	zetta	Z	10^{-21}	zepto	z
10^{24}	yotta	Y	10^{-24}	yocto	Y

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *The International System of Units (SI),* NIST Special Publication 330, 1991 Edition (Washington, DC, August 1991), p. 10.

Table E3. Other Physical Conversion Factors

Energy Source	Original Unit		Conversion Factor		Final Unit
Petroleum	barrels (bbl)	x	42[a]	=	U.S. gallons (gal)
Coal	short tons	x	2,000[a]	=	pounds (lb)
	long tons	x	2,240[a]	=	pounds (lb)
	metric tons (t)	x	1,000[a]	=	kilograms (kg)
Wood	cords (cd)	x	1.25[b]	=	short tons
	cords (cd)	x	128[a]	=	cubic feet (ft^3)

[a]Exact conversion.

[b]Calculated by the U.S. Energy Information Administration.

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices*, NIST Handbook 44, 1994 Edition (Washington, DC, October 1993), pp. B-10, C-17, and C-21.

Appendix F

What's New in the State Energy Data System

Tables and data files in the State Energy Data System (SEDS) supply a new year of data each production cycle. The latest data may be preliminary and, therefore, revised the following cycle. Changes made to consumption and price source data for historical years are also regularly incorporated into SEDS.

Listed below are changes in SEDS contents beyond the standard updates.

Total Energy

Beginning in 1981, energy losses and co-products from the production of fuel ethanol are incorporated into State and U.S. industrial sector energy consumption. Energy losses for the United States are allocated to the States according to their fuel ethanol production shares. They are then added to the State and U.S. industrial and total energy consumption.

Subtotals for fossil fuels and renewable energy consumption are presented in the tables on "Total Energy by Source." In the fossil fuel subtotal, the double-counting of supplemental gaseous fuels is removed, and fuel ethanol is excluded from petroleum consumption. Fuel ethanol and energy losses and co-products from fuel ethanol production are covered in the renewable energy subtotal. However, in the tables on consumption by sector, estimates for natural gas and motor gasoline are presented as they are consumed, that is, including supplemental gaseous fuels and fuel ethanol, respectively.

Petroleum and Fuel Ethanol

Fuel Ethanol

The heat content of fuel ethanol is revised from 3.539 to 3.563 to account for denaturant (pentanes plus or motor gasoline added to ethanol to make it undrinkable).

Energy losses and co-products from the production of fuel ethanol are now incorporated into State and U.S. industrial sector energy consumption. Beginning in 1981, energy losses for the United States are allocated to each State according to the fuel ethanol production share for each State. Energy losses for each State and the United States are then added to the State and U.S. industrial and total energy consumption.

Liquefied Petroleum Gases (LPG)

The *2008 Sales of Natural Gas Liquids and Liquefied Refinery Gases,* published by the American Petroleum Institute (API), no longer includes State-level sales estimates for natural gas liquids and liquefied refinery gases. Only propane sales data are available at the State level. A new methodology has been developed to estimate State-level propane consumption and all other LPG consumption in 2008. For propane consumption, API's State shares of propane sales are applied to the U.S. product supplied published in EIA *Petroleum Supply Annual (PSA)*. For all other LPG, State shares derived from the 2007 API report are used to allocate the 2008 U.S. product supplied of LPG other than propane from *PSA*.

In addition, a new variable has been created to estimate LPG sold for residential use as shares of LPG sold for residential *and* commercial use. Previously, a fixed share of 85 percent was assumed for all States. State-level estimates from 2003 forward are based on propane sales data in the API report, and the average shares of 2003 through 2008 are applied to the earlier years. Data for LPG sold for residential and commercial use are then split into the two end-use sectors using this new variable.

Petroleum Coke

Beginning in 1993, the series used to allocate petroleum coke consumed by other industrial users, State's aluminum production capacity adjusted for under-utilization of the plants, is revised.

Glossary

Asphalt: A dark brown-to-black cement-like material obtained by petroleum processing and containing bitumens as the predominant component; used primarily for road construction. It includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts.

ASTM: The American Society for Testing and Materials.

Aviation Gasoline (Finished): A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in aviation reciprocating engines. Fuel specifications are provided in ASTM Specification D 910 and Military Specification MIL–G–5572. *Note:* Data on blending components are not counted in data on finished aviation gasoline.

Aviation Gasoline Blending Components: Naphthas that will be used for blending or compounding into finished aviation gasoline (e.g., straight run gasoline, alkylate, reformate, benzene, toluene, and xylene). Excludes oxygenates (alcohols, ethers), butane, and pentanes plus. Oxygenates are reported as other hydrocarbons, hydrogen, and oxygenates.

Barrel (petroleum): A unit of volume equal to 42 U.S. gallons.

Barrels per Calendar Day: The amount of input that a distillation facility can process under usual operating conditions. The amount is expressed in terms of capacity during a 24-hour period and reduces the maximum processing capability of all units at the facility under continuous operation to account for the following limitations that may delay, interrupt, or slow down production: 1) the capability of downstream processing units to absorb the output of crude oil processing facilities of a given refinery (no reduction is necessary for intermediate streams that are distributed to other than downstream facilities as part of a refinery's normal operation); 2) the types and grades of inputs to be processed; 3) the types and grades of products expected to be manufactured; 4) the environmental constraints associated with refinery operations; 5) the reduction of capacity for scheduled downtime due to such conditions as routine inspection, maintenance, repairs, and turnaround; and 6) the reduction of capacity for unscheduled downtime due to such conditions as mechanical problems, repairs, and slowdowns.

Barrels per Stream Day: The maximum number of barrels of input that a distillation facility can process within a 24-hour period when running at full capacity under optimal crude and product slate conditions with no allowance for downtime.

Biomass Waste: Organic non-fossil material of biological origin that is a byproduct or a discarded product. "Biomass waste" includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural crop byproducts, straw, and other biomass solids, liquids, and gases; but excludes wood and wood-derived fuels (including black liquor), biofuels feedstock, biodiesel, and fuel ethanol. *Note*: EIA "biomass waste" data also include energy crops grown specifically for energy production, which would not normally constitute waste.

Black Liquor: A byproduct of the paper production process, alkaline spent liquor, that can be used as a source of energy. Alkaline spent liquor is removed from the digesters in the process of chemically pulping wood. After evaporation, the residual "black" liquor is burned as a fuel in a recovery furnace that permits the recovery of certain basic chemicals.

British Thermal Unit (Btu): The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the

temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Bunker Fuels: Fuel supplied to ships and aircraft, both domestic and foreign, consisting primarily of residual fuel oil and distillate fuel oil for ships and kerosene-type jet fuel for aircraft. The term "international bunker fuels" is used to denote the consumption of fuel for international transport activities. *Note*: For the purposes of greenhouse gas emissions inventories, data on emissions from combustion of international bunker fuels are subtracted from national emissions totals. Historically, bunker fuels have meant only ship fuel.

Catalytic Cracking: The refining process of breaking down the larger, heavier, and more complex hydrocarbon molecules into simpler and lighter molecules. Catalytic cracking is accomplished by the use of a catalytic agent and is an effective process for increasing the yield of gasoline from crude oil. Catalytic cracking processes fresh feeds and recycled feeds.

Chained Dollar Gross Domestic Product: A measure of gross domestic product using real prices. See **Chained Dollars** and **Gross Domestic Product (GDP)**.

Chained Dollars: A measure used to express real prices. Real prices are those that have been adjusted to remove the effect of changes in the purchasing power of the dollar; they usually reflect buying power relative to a reference year. Prior to 1996, real prices were expressed in constant dollars, a measure based on the weights of goods and services in a single year, usually a recent year. In 1996, the U.S. Department of Commerce introduced the chained-dollar measure. The new measure is based on the average weights of goods and services in successive pairs of years. It is "chained" because the second year in each pair, with its weights, becomes the first year ofthe next pair. The advantage of using the chained-dollar measure is that it is more closely related to any given period covered and is therefore subject to less distortion over time.

Coal: A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material. It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time. Coals are classified according to their degree of progressive alteration from lignite to anthracite. In the U.S. classification, the ranks of coal include lignite, subbituminous coal, bituminous coal, and anthracite and are based on fixed carbon, volatile matter, heating value, and agglomerating (or caking) properties.

Coal Coke: A solid carbonaceous residue derived from low-ash, low-sulfur bituminous coal from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000 degrees Fahrenheit so that the fixed carbon and residual ash are fused together. Coke is used as a fuel and as a reducing agent in smelting iron ore in a blast furnace.

Coke Plants: Plants where coal is carbonized in slot or beehive ovens for the manufacture of coke.

Combined-Heat-and-Power (CHP) Plant: A plant designed to produce both heat and electricity. If one or more units of the plant is a CHP unit, then the whole plant is designated as a CHP plant. *Note*: This term is being used in place of the term "cogenerator" that was used by EIA in the past. CHP better describes the facilities because some of the plants included do not produce heat and power in a sequential fashion and, as a result, do not meet the legal definition of cogeneration specified in the Public Utility Regulatory Polices Act (PURPA).

Commercial Sector: An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. *Note*: This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.

Conversion Factor: A number that translates units of one system into corresponding values of another system. Conversion factors can be used to translate physical units of measure for various fuels into Btu equivalents. See **British Thermal Unit**.

Cord (wood): A cord of wood measures 4 feet by 4 feet by 8 feet or 128 cubic feet.

Crude Oil (Including Lease Condensate): A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Depending upon the characteristics of the crude stream, it may also include: 1) small amounts of hydrocarbons that exist in gaseous phase in natural underground reservoirs but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators and are subsequently commingled with the crude stream without being separately measured. Lease condensate recovered as a liquid from natural gas wells in lease or field separation facilities and later mixed into the crude stream is also included; 2) small amounts of nonhydrocarbons produced with the oil, such as sulfur and various metals; and 3) drip gases, and liquid hydrocarbons produced from tar sands, gilsonite, and oil shale. Liquids produced at natural gas processing plants are excluded. Crude oil is refined to produce a wide array of petroleum products, including heating oils; gasoline, diesel and jet fuels; lubricants; asphalt; ethane, propane, and butane; and many other products used for their energy or chemical content.

Crude Oil Used Directly: Crude oil consumed as fuel by petroleum pipelines and on crude oil leases.

Cubic foot (cf), natural gas: The amount of natural gas contained at standard temperature and pressure (60 degrees Fahrenheit and 14.73 pounds standard per square inch) in a cube whose edges are one foot long.

Denaturant: Petroleum, typically pentanes plus or conventional motor gasoline, added to fuel ethanol to make it unfit for human consumption. Fuel ethanol is denatured, usually prior to transport from the ethanol production facility, by adding 2 to 5 volume percent denaturant.

Diesel Fuel: A fuel composed of distillate fuel oils obtained in petroleum refining operation or blends of such distillate fuel oils with residual fuel oil used in motor vehicles. The boiling point and specific gravity are higher for diesel fuels than for gasoline.

Distillate Fuel Oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils. Products known as No. 1, No. 2, and No. 4 diesel fuel are used in on-highway diesel engines, such as those in trucks and automobiles, as well as off-highway engines, such as those in railroad locomotives and agricultural machinery. Products known as No. 1, No. 2, and No. 4 fuel oils are used primarily for space heating and electric power generation.

Electrical System Energy Losses: The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted-for uses.

Electricity Retail Sales: The amount of electricity sold by electric utilities and other energy service providers to customers purchasing electricity for their own use and not for resale.

Electric Power Sector: An energy-consuming sector that consists of electricity-only and combined-heat-and-power (CHP) plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the public. *Note*: This sector includes electric utilities and independent power producers.

Electric Utility: A corporation, person, agency, authority, or other legal entity or instrumentality aligned with distribution facilities for delivery of electric energy for use primarily by the public. Included are investor-owned electric utilities, municipal and State utilities, Federal electric utilities, and rural electric cooperatives. A few entities that are tariff based and corporately aligned with companies that own distribution facilities are also included. Electric utilities are included in the electric power sector. *Note*: Due to the issuance of FERC Order 888 that required traditional electric utilities to functionally unbundle their generation, transmission, and distribution operations, "electric utility" currently has inconsistent interpretations from State to State.

End-Use Sectors: The residential, commercial, industrial, and transportation sectors of the economy.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to

produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours, while heat energy is usually measured in British thermal units.

Energy Consumption: The use of energy as a source of heat or power or as a raw material input in the manufacturing process.

Energy-Consuming Sectors: See **Energy-Use Sectors**.

Energy-Use Sectors: A group of major energy-consuming components of U.S. society developed to measure and analyze energy use. The sectors most commonly referred to in EIA are: residential, commercial, industrial, transportation, and electric power.

Ethanol: See **Fuel Ethanol.**

Exports: Shipments of goods from within the 50 States and the District of Columbia to U.S. possessions and territories or to foreign countries.

Federal Energy Regulatory Commission (FERC): The Federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification. FERC is an independent regulatory agency within the Department of Energy and is the successor to the Federal Power Commission.

Federal Power Commission (FPC): The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. It was abolished on September 30, 1977, when the Department of Energy was created. Its functions were divided between the Department of Energy and the Federal Energy Regulatory Commission, an independent regulatory agency.

Fiscal Year: The U.S. Government's fiscal year runs from October 1 through September 30. The fiscal year is designated by the calendar year in which it ends; e.g., fiscal year 2004 begins on October 1, 2003, and ends on September 30, 2004.

Fossil Fuel: An energy source formed in the Earth's crust from decayed organic material, such as petroleum, coal, and natural gas.

Fossil-Fueled Steam-Electric Power Plant: An electricity generation plant in which the prime mover is a turbine rotated by high-pressure steam produced in a boiler by heat from burning fossil fuels.

Fuel Ethanol: Ethanol intended for fuel use. Fuel ethanol in the United States must be anhydrous (less than 1 percent water). Fuel ethanol is denatured (made unfit for human consumption), usually prior to transport from the ethanol production facility, by adding 2 to 5 volume percent petroleum, typically pentanes plus or conventional motor gasoline. Fuel ethanol is used principally for blending in low concentrations with motor gasoline as an oxygenate or octane enhancer. In high concentrations, it is used to fuel alternative-fuel vehicles specially designed for its use.

Gasohol: A blend of finished motor gasoline containing alcohol (generally ethanol but sometimes methanol) at a concentration between 5.7 percent and 10 percent by volume.

Geothermal Energy: Hot water or steam extracted from geothermal reservoirs in the Earth's crust and used for geothermal heat pumps, water heating, or electricity generation.

Gross Domestic Product (GDP): The total value of goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the supplier (that is, the workers and, for property, the owners) may be either U.S. residents or residents of foreign countries.

Heat Content: The amount of heat energy available to be released by the transformation or use of a specified physical unit of an energy form (e.g., a ton of coal, a barrel of oil, a kilowatthour of electricity, a cubic foot of natural gas, or a pound of steam). The amount of heat energy is commonly expressed in British thermal units (Btu). Note: Heat content of combustible energy forms can be expressed in terms of either gross heat content (higher or upper heating value) or net heat content (lower heating value), depending upon whether or not the available heat energy includes or excludes the energy used to vaporize water (contained in the original energy form or created during the combustion process). The Energy Information Administration typically uses gross heat content values.

Heat Rate: A measure of generating station thermal efficiency commonly stated as Btu per kilowatthour. Note: Heat rates can be expressed as either gross or net heat rates, depending whether the electricity output is gross or net generation. Heat rates are typically expressed as net heat rates.

Hydroelectric Power: The production of electricity from the kinetic energy of falling water.

Hydroelectric Power, Conventional: Hydroelectric power generated from flowing water that is not created by hydroelectric pumped storage.

Hydroelectric Pumped Storage: Hydroelectric power that is generated during peak load periods by using water previously pumped into an elevated storage reservoir during off-peak periods when excess generating capacity is available to do so. When additional generating capacity is needed, the water can be released from the reservoir through a conduit to turbine generators located in an electric power plant at a lower level.

Hydroelectric Power Plant: A plant in which the turbine generators are driven by falling water.

Imports: Receipts of goods into the 50 States and the District of Columbia from U.S. possessions and territories or from foreign countries.

Independent Power Producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility. *Note:* Independent power producers are included in the electric power sector.

Industrial Sector: An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31-33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.

Jet Fuel, Kerosene-Type: A kerosene-based product with a maximum distillation temperature of 400 degrees Fahrenheit at the 10-percent recovery point and a final maximum boiling point of 572 degrees Fahrenheit and meeting ASTM Specification D 1655 and Military Specifications MIL–T–5624P and MIL–T–83133D (Grades JP–5 and JP–8). It is used for commercial and military turbojet and turboprop aircraft engines.

Jet Fuel, Naphtha-Type: A fuel in the heavy naphtha boiling range having an average gravity of 52.8 degrees API, 20 to 90 percent distillation temperatures of 290 degrees to 470 degrees F., and meeting Military Specification MIL–T–5624L (Grade JP–4). It is used primarily for military turbojet and turboprop aircraft engines because it has a lower freeze point than other aviation fuels and meets engine requirements at high altitudes and speeds.

Kerosene: A light petroleum distillate that is used in space heaters, cook stoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps. Kerosene has a maximum distillation temperature of 400 degrees Fahrenheit at the 10-percent recovery point, a final boiling point of 572 degrees Fahrenheit, and a minimum flash point of 100 degrees Fahrenheit. Included are No. 1-K and No. 2-K, the two grades recognized by ASTM Specification D 3699 as well as all other grades of kerosene called range or stove oil, which have properties similar to those of No. 1 fuel oil. See **Jet Fuel, Kerosene-Type**.

Kilowatthour (kWh): A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kilowatthour is equivalent to 3,412 Btu.

Lease and Plant Fuel: Natural gas used in well, field, and lease operations (such as gas used in drilling operations, heaters, dehydrators, and field compressors), and as fuel in natural gas processing plants.

Lease Condensate: A mixture consisting primarily of pentanes and heavier hydrocarbons which is recovered as a liquid from natural gas in lease separation facilities. This category excludes natural gas plant liquids, such as butane and propane, which are recovered at downstream natural gas processing plants or facilities.

Liquefied Petroleum Gases (LPG): A group of hydrocarbon-based gases derived from crude oil refining or natural gas fractionation. They include

ethane, ethylene, propane, propylene, normal butane, butylene, isobutane, and isobutylene. For convenience of transportation, these gases are liquefied through pressurization.

Lubricants: Substances used to reduce friction between bearing surfaces, or incorporated into other materials used as processing aids in the manufacture of other products, or used as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Lubricants include all grades of lubricating oils, from spindle oil to cylinder oil to those used in greases.

Methanol: A light, volatile alcohol (CH_3OH) eligible for motor gasoline blending.

Miscellaneous Petroleum Products: All finished petroleum products not classified elsewhere—for example, petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils.

Motor Gasoline Blending Components: Naphthas (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, xylene) used for blending or compounding into finished motor gasoline. These components include reformulated gasoline blendstock for oxygenate blending (RBOB) but exclude oxygenates (alcohols, ethers), butane, and pentanes plus.

Motor Gasoline (Finished): A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as defined in ASTM Specification D–4814 or Federal Specification VV–G–1690C, is characterized as having a boiling range of 122 to 158 degrees Fahrenheit at the 10-percent recovery point to 365 to 374 degrees Fahrenheit at the 90-percent recovery point. "Motor Gasoline" includes conventional gasoline; all types of oxygenated gasoline, including gasohol; and reformulated gasoline, but excludes aviation gasoline. Note: Volumetric data on blending components, such as oxygenates, are not counted in data on finished motor gasoline until the blending components are blended into the gasoline.

Natural Gas: A gaseous mixture of hydrocarbon compounds, the primary one being methane.

Natural Gas, Dry: Natural gas which remains after: 1) the liquefiable hydrocarbon portion has been removed from the gas stream (i.e., gas after lease, field, and/or plant separation); and 2) any volumes of nonhydrocarbon gases have been removed where they occur in sufficient quantity to render the gas unmarketable. Dry natural gas is also known as consumer-grade natural gas. The parameters for measurement are cubic feet at 60 degrees Fahrenheit and 14.73 pounds per square inch absolute.

Natural Gasoline: A term used in the gas processing industry to refer to a mixture of liquid hydrocarbons (mostly pentanes and heavier hydrocarbons) extracted from natural gas. It includes isopentane.

Net Interstate Flow of Electricity: The difference between the sum of electricity sales and losses within a State and the total amount of electricity generated within that State. A positive number indicates that more electricity (including associated losses) came into the State than went out of the State during the year; conversely, a negative number indicates that more electricity (including associated losses) went out of the State than came into the State.

Non-Biomass Waste: Material of non-biological origin that is a byproduct or a discarded product. "Non-biomass waste" includes municipal solid waste from non-biogenic sources, such as plastics, and tire-derived fuels.

Nonutilities: See **Nonutility Power Producer**.

Nonutility Power Producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for electric generation and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers). Nonutility power producers are without a designated franchised service area and do not file forms listed in the *Code of Federal Regulations*, Title 18, Part 141.

North American Industry Classification System (NAICS): A coding system developed jointly by the United States, Canada, and Mexico to classify businesses and industries according to the type of economic activity in which they are engaged. NAICS replaces the Standard Industrial Classification (SIC) codes.

Nuclear Electric Power (nuclear power): Electricity generated by the use of the thermal energy released from the fission of nuclear fuel in a reactor.

PAD Districts: Petroleum Administration for Defense Districts. Geographic aggregations of the 50 States and the District of Columbia into five districts for the Petroleum Administration for Defense in 1950. The districts were originally instituted for economic and geographic reasons as Petroleum Administration for War (PAW) Districts, which were established in 1942.

Pentanes Plus: A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

Petrochemical Feedstocks: Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. In this report the categories reported are "Naphthas Less Than 401° F. Endpoint" and "Other Oils Equal to or Greater Than 401° F. Endpoint."

Petroleum: A broadly defined class of liquid hydrocarbon mixtures. Included are crude oil, lease condensate, unfinished oils, refined products obtained from the processing of crude oil, and natural gas plant liquids. *Note*: Volumes of finished petroleum products include nonhydrocarbon compounds, such as additives and detergents, after they have been blended into the products.

Petroleum Coke: A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke or catalyst coke.

Petroleum Coke, Catalyst: The carbonaceous residue that is deposited on and deactivates the catalyst used in many catalytic operations (e.g., catalytic cracking). Carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. That carbon or coke is not recoverable in a concentrated form.

Petroleum Coke, Marketable: Those grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon. Marketable petroleum coke may be sold as is or further purified by calcining.

Petroleum Consumption: The sum of all refined petroleum products supplied. See **Products Supplied (petroleum)**.

Petroleum Products: Products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Products Supplied (petroleum): Approximately represents consumption of petroleum products because it measures the disappearance of these products from primary sources, i.e., refineries, natural gas-processing plants, blending plants, pipelines, and bulk terminals. In general, product supplied of each product in any given period is computed as follows field production, plus refinery production, plus imports, plus unaccounted-for crude oil (plus net receipts when calculated on a PAD District basis) minus stock change, minus crude oil losses, minus refinery inputs, and minus exports.

Photovoltaic Energy: Direct-current electricity generated from photovoltaic cells. See **Photovoltaic Cells (PVC)**.

Photovoltaic Cells (PVC): An electronic device consisting of layers of semiconductor materials fabricated to form a junction (adjacent layers of materials with different electronic characteristics) and electrical contacts and being capable of converting incident light directly into electricity (direct current).

Plant Condensate: One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants.

Propane: A normally gaseous straight-chain hydrocarbon (C_3H_8). It is a colorless paraffinic gas that boils at a temperature of -43.67° F. It is extracted from natural gas or refinery gas streams. It includes all products

designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD–5 propane.

Refinery (petroleum): An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

Renewable Energy: Energy obtained from sources that are essentially inexhaustible (unlike, for example, fossil fuels, which are in finite supply). Renewable sources of energy include conventional hydroelectric power, wood, waste, alcohol fuels, geothermal, solar, and wind.

Residential Sector: An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.

Residual Fuel Oil: The heavier oils, known as No. 5 and No. 6 fuel oils, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations. It conforms to ASTM Specifications D396 and D975 and Federal Specification VV-F-815C. No. 5, a residual fuel oil of medium viscosity, is also known as Navy Special and is defined in Military Specification MIL-F-859E, including Amendment 2 (NATO Symbol F-770). It is used in steam-powered vessels in government service and inshore powerplants. No. 6 fuel oil includes Bunker C fuel oil and is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes.

Road Oil: Any heavy petroleum oil, including residual asphaltic oil, used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades, from 0, the most liquid, to 5, the most viscous.

Short Ton (coal): A unit of weight equal to 2,000 pounds.

Solar Thermal Energy: The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.

Special Naphthas: All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. Those products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specifications D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline, or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks, are excluded.

Standard Industrial Classification (SIC): A set of codes developed by the Office of Management and Budget which categorizes industries into groups with similar economic activities. It has been replaced by **North American Industry Classification System**.

Still Gas (refinery gas): Any form or mixture of gas produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane, ethane, ethylene, normal butane, butylene, propane, and propylene. It is used primarily as refinery fuel and petrochemical feedstock.

Supplemental Gaseous Fuels: Synthetic natural gas, propane-air, coke oven gas, refinery gas, biomass gas, air injected for Btu stabilization, and manufactured gas commingled and distributed with natural gas.

Transportation Sector: An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. In this report, natural gas used in the operation of natural gas pipelines is included in the transportation sector.

Unfinished Oils: All oils requiring further processing, except those requiring only mechanical blending. Unfinished oils are produced by partial refining of crude oil and include naphthas and lighter oils, kerosene and light gas oils, heavy gas oils, and residuum.

Unfractionated Streams: Mixtures of unsegregated natural gas liquid components, excluding those in plant condensate. This product is extracted from natural gas.

United States: The 50 States and the District of Columbia.

Value Added by Manufacture: A measure of manufacturing activity that is derived by subtracting the cost of materials (which covers materials, supplies, containers, fuel, purchased electricity, and contract work) from the value of shipments. This difference is then adjusted by the net change in finished goods and work-in-progress between the beginning- and end-of-year inventories.

Vessel Bunkering: Includes sales for the fueling of commercial or private boats, such as pleasure craft, fishing boats, tugboats, and ocean-going vessels, including vessels operated by oil companies. Excluded are volumes sold to the U.S. Armed Forces.

Waste Energy: See **Biomass Waste** and **Non-Biomass Waste**.

Wax: A solid or semi-solid material consisting of a mixture of hydrocarbons obtained or derived from petroleum fractions, or through a Fischer-Tropsch type process, in which the straight- chained paraffin series predominates. This includes all marketable wax, whether crude or refined, with a congealing point (ASTM D 938) between 100 and 200 degrees Fahrenheit and a maximum oil content (ASTM D 3235) of 50 weight percent.

Wind Energy: Kinetic energy present in wind motion that can be converted to mechanical energy for driving pumps, mills, and electric power generators.

Wood Energy: Wood and wood products used as fuel, including round wood (cord wood), limb wood, wood chips, bark, sawdust, forest residues, charcoal, pulp waste, and spent pulping liquor.